

August 2003/\$4

AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION

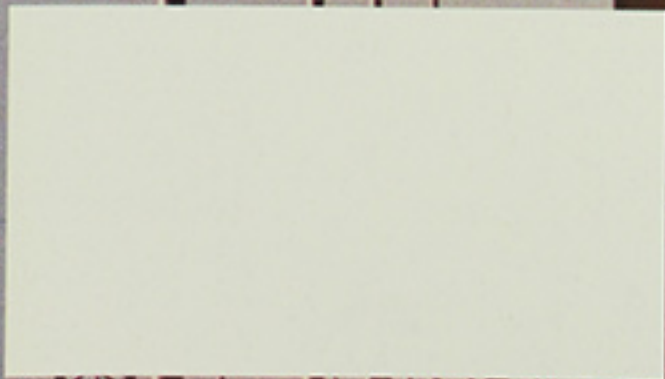
MAGAZINE

USAF Space Almanac

100 Tankers

Paying for Military Space

War from Afar





MOST PEOPLE SEE A PLANE. WE SEE AN ENTIRE BATTLESPACE.



LOCKHEED MARTIN • RAYTHEON • SAIC
L3 COMMUNICATIONS • ALPHATECH

When it comes time to build the critical Battle Management Command and Control (BMC2) node for the Air Force's Command and Control Constellation, the Lockheed Martin team has the edge. We have proven experience in developing large-scale integrated BMC2 solutions with the lowest risk, greatest affordability and highest performance for our customers. Aboard the E-10A battle control aircraft, commanders will rely on our advanced information management technology to transform raw sensor data into actionable knowledge – delivering time critical targeting and intelligence across the battlespace within single digit minutes.

AIR FORCE

JOURNAL OF THE AIR FORCE ASSOCIATION

MAGAZINE

August 2003, Vol. 86, No. 8

www.afa.org

- 4 Letters
- 11 Aerospace World
- 17 Index to Advertisers
- 18 Senior Staff Changes
- 19 Action in Congress
- 21 Verbatim
- 52 Field Contacts
- 53 Flashback
- 62 Books
- 91 This is AFA
- 92 AFA/AEF National Report
- 95 Unit Reunions
- 96 Pieces of History



About the cover: An Atlas V rocket is launched from Cape Canaveral AFS, Fla., on May 13. See "Space Almanac," p. 22.

2 Editorial: The Mobility Edge

By Robert S. Dudney
A military that runs on airlift can't afford to run short.

7 Washington Watch

By John A. Tirpak
Warhog Wars, the Army Leadership Makeover, Global Shift in US Forces ...

22 Space Almanac

By Tamar A. Mehuron
Facts, figures, agency and system profiles, budget data, and other information about US and foreign space programs.

54 Footing the Bill for Military Space

By Benjamin S. Lambeth
How can the Air Force keep funding two major mission areas—air and space?

58 War From Afar

By Richard J. Newman
Important parts of Operation Iraqi Freedom were carried out by remote control.



74



64

64 100 Tankers

By John A. Tirpak
The Air Force seeks a deal to replace its aged KC-135s with leased commercial tankers.

70 Command From the Air

By Adam J. Hebert
USAF's premier airborne battle management systems often leave enemy forces nowhere to hide.

74 Sasha the Salesman

By Phillip S. Meilinger
Neither wooden leg, nor corporate intrigue, nor poor elocution could keep de Seversky from his mission.

80 The "New Look"

By Herman S. Wolk
Under Eisenhower, strategic airpower became the centerpiece of US military strategy.

84 CSAR, Under New Management

By Adam J. Hebert
Combat search and rescue soon will be part of the special operations world.

88 AFA Nominees for 2003-04

Candidates for national offices and the Board of Directors.

AIR FORCE Magazine (ISSN 0730-6784) August 2003 (Vol. 86, No. 8) is published monthly by the Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Phone (703) 247-5900. Second-class postage paid at Arlington, Va., and additional mailing offices. **Membership Rate:** \$36 per year; \$90 for three-year membership. **Life Membership (nonrefundable):** \$500 single payment, \$525 extended payments. **Subscription Rate:** \$36 per year; \$29 per year additional for postage to foreign addresses (except Canada and Mexico, which are \$10 per year additional). Regular issues \$4 each. USAF Almanac issue \$6 each. **Change of address** requires four weeks' notice. Please include mailing label. **POSTMASTER:** Send changes of address to Air Force Association, 1501 Lee Highway, Arlington, VA 22209-1198. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association. Copyright 2003 by Air Force Association.

By Robert S. Dudley, Editor in Chief

The Mobility Edge

IN GULF War II, USAF's air mobility forces put on a superb performance. Airlifters carried out a swift buildup of US power in the theater—108,000 tons of cargo and thousands of troops in mere months. Day and night, they supplied hard-charging US units and also repositioned special forces on a moment's notice. When Turkey barred US ground operations from its soil, airlifters dropped paratroopers, vehicles, and supplies into Iraq, creating a front where none existed. C-17s even hauled fuel to isolated ground units.

A tanker "bridge" stretched 9,000 miles from the US through Europe and Southwest Asia to the Indian Ocean. It, as well as theater-based tankers, made possible the strike missions flown by aircraft of all services. Tankers allowed bombers to fly non-stop from US bases to Iraqi targets.

In a way, USAF's air mobility team was just carrying on a tradition. Its record of success is long. The 1948-49 Berlin Airlift thwarted Soviet aggression in Europe. In Vietnam, airlift helped break the siege at Khe Sanh. Military Airlift Command resupplied Israel at a critical moment in the 1973 Mideast War. In Gulf War I, USAF staged the equivalent of one Berlin Airlift every six weeks. As for Operation Enduring Freedom, everything that went into or out of Afghanistan went by airlift, and every combat aircraft was dependent on tankers to reach a target.

As Air Force Gen. Charles Wald, deputy commander of US European Command, once noted, "That's the big difference between us and other countries; we can get anywhere we need rapidly."

Air mobility has had a sensational run and has come to symbolize US superpower status. It has been so good, for so long, that some may have forgotten that such capability is not a birthright but something that must be built, renewed, and protected.

It has limitations. In Iraq, the mobility force was pressed to the max, with Air Mobility Command averaging nearly 500 airlift and tanker missions each day, not including those

flown by transports and tankers temporarily placed under US Central Command. In March, the first month of the war, 94 percent of all C-5s and 91 percent of all C-17s were committed to worldwide operations.

Despite such high utilization rates, there simply wasn't sufficient lift for the war and the needs of other theaters. Gen. John W. Handy, the commander of US Transportation Com-

A military that runs on airlift can't afford to run short.

mand and Air Mobility Command, said on June 25 that he made six attempts to meet all the demands of the war plan shaped by Gen. Tommy R. Franks, head of Central Command. He could not do it, and he and Franks had to "negotiate" the use of lift and aerial refueling.

There is little doubt the transportation system could not have handled another major crisis and smaller demands in Afghanistan, Bosnia, and Kosovo.

Fresh appreciation of this reality has sparked calls for a new look at the mobility requirement. A landmark 1981 study concluded the US needed 66 million ton-miles per day of airlift capacity. A post-Cold War review in 1992 lowered the figure to 57 mtm/d. In 1995, a third study dropped the goal again—to 49 mtm/d. The most recent analysis, in 2001, pushed the number back up to 54.5 mtm/d.

USAF's actual capability falls well short of this requirement. Present wartime capability comes in at 47.3 mtm/d, 13 percent less than the minimum stated need.

Moreover, the true requirement surely has risen. Today's smaller force must be able to move swiftly and over long distances. Also, the Global War on Terror, which Handy said has brought "dramatic stress across the mobility system," has

quicken the pace of air mobility operations at home and overseas. In Handy's view, a new requirements study is very much in order. "We want it as soon as possible," he said.

One reason is uncertainty about the ultimate size of the C-17 fleet. The Air Force has approval to buy 180 advanced lifters, but Handy said USAF needs 222 C-17s, at least, just to meet the old 2001 goal. And, the C-17 line is winding down; if USAF is to buy more, it will have to decide to do so within the next year.

Another worry is the tanker fleet. It is based on 544 KC-135s (average age 43 years), many of which are shot through with corrosion and require huge amounts of expensive maintenance. Handy reported that, with planned budgets, tanker recapitalization would drag on for 40 years, meaning USAF would one day be flying 80-year-old KC-135s. "It just doesn't make any sense," said Handy, but "that is the reality we face."

DOD has given the Air Force a green light to lease 100 KC-767 refuelers, modified 767 commercial jets, for \$16 billion. Handy calls the 767s a "near-term solution to a long-term challenge," requiring considerably more than 100 aircraft.

No one seriously believes that the United States can accept reduced air mobility. Even less do they believe current and planned programs will sustain today's capability. Many would like to see more aggressive procurement.

Political support is uncertain. Some argue that the nation can get by with prudent upgrades and workarounds, without spending huge amounts. Sen. John McCain (R-Ariz.) claims the KC-135 could be maintained with a low-cost re-engining program. How that would remedy the corrosion problem, McCain does not say.

Clearly, the US faces a major challenge. The Pentagon needs to get on with the new requirement study and find out how many airplanes it really needs. After that, it should get busy acquiring them—fast. A military that runs on airlift can't afford to run short. ■

US101



36,000

MISSION DRIVEN ~~32,000~~ HOURS.

The only mission-proven choice, from Combat Search and Rescue to Executive Transport.

- Mission-proven worldwide: 36,000 flying hours and counting
- 170 mph speed
- 750-nautical-mile range
- 7-hour-plus endurance
- Can carry 30-plus troops, depending on configuration
- Air-transportable and self-deployable
- All-weather operation
- Exceptional systems redundancy
- Advanced survivability technologies
- The new standard in personnel recovery
- The next generation of helicopter, ready now

US101 REPORTING FOR DUTY

AGUSTA WESTLAND



LOCKHEED MARTIN



Bell Helicopter

A Textron Company

Space Power

Your editorial [*"Space Power in the Gulf," June, p. 2*] is right on. One of the space systems used by weapons, ground forces, etc., was GPS. Nice that we have that system.

In the early 1980s, every military service was out to eliminate its funding. No one wanted to support it. One of the key people who fought a very lonely battle to keep that system alive was Col. William Reynolds of Space Division. He managed to squeeze a little money from this program and from that program to keep GPS alive. His was an unsung program office victory that has paid big dividends 20 years later.

You ought to do an article on the twists and turns and near cancellation of GPS. All the important victories aren't just won on the battlefield.

Bill Thayer
San Diego

On Casualties and the CEP

The table "From the Revolution to the Gulf" [*see "Casualties," June, p. 48*] contains a typographical omission: Civil War "Other Deaths" should be 224,097, not 24,097.

Saran Jonas
New York

■ *The reader is correct. The number of "Other Deaths" during the Civil War is 224,097. The error has been corrected on our Web site.—THE EDITORS*

I challenge a statement on p. 49 of the "Casualties" article. The statement: "In World War II, the circular error probable—the standard Air Force measure of bombing effectiveness—for a B-17 dropping gravity bombs was 3,300 feet."

Whoa! That figure must have evolved from missions dropping through clouds, smoke, or fog, on a heading and ETA from a landmark 50 miles away. I hasten to advise our modern airmen that there is something radically amiss with that figure (pun intended). We were a heck of a lot better than that!

The bombers of World War II were equipped with the gyro-stabilized

Norden bombsight and Honeywell autopilot systems. For their day, these were unbelievably efficient, precision components. But they were only as good as those who set them up.

Lt. Col. John H. Ralph,
USAF (Ret.)
Enid, Okla.

■ *According to the US Air Force, the circular error probable for a B-17 in 1943 was 3,300 feet. The difference in accuracy then and now is not a reflection on the skill or courage of the aircrews but rather a consequence of how technology has improved.—*

JOHN T. CORRELL, CONTRIBUTING EDITOR

Be Fair

John Correll performs a valuable service in compiling quotes from the recent war, but he should work harder to be fair. [*See "Verbatim Special: Gulf War II," June, p. 40.*]

He says that I predicted up to 5,000 US combat deaths in the war. That was the upper bound of my estimates, done with a variety of wargaming tools; in the same article, and in the same place from which Correll drew the other number, I also explicitly stated that US losses could be as low as 100. He chose not to include that information, insinuating that I predicted something near the higher number, which was not the case.

On a related note, I also wrote two op-eds in major newspapers during the difficult second week of the war, predicting success and supporting

Do you have a comment about a current article in the magazine? Write to "Letters," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. (E-mail: letters@afa.org.) Letters should be concise and timely. We cannot acknowledge receipt of letters. We reserve the right to condense letters. Letters without name and city/base and state are not acceptable. Photographs cannot be used or returned.—THE EDITORS

Publisher
Donald L. Peterson

Editorial afmag@afa.org

Editor in Chief
Robert S. Dudley

Managing Editor
Suzann Chapman

Executive Editor
John A. Tirpak

Senior Editor
Adam J. Hebert

Associate Editor
Tamar A. Mehuron

Assistant Managing Editor
Juliette Kelsey Chagnon

Assistant Managing Editor
Frances McKenney

Editorial Associate
Chequita Wood

Art Director
Guy Aceto

Assistant Art Director
Heather Lewis

Production Director
Robert T. Shaughness

Research Librarian
Pearlie M. Draughn

Contributing Editors
John T. Correll
Bruce D. Callander
Rebecca Grant
Peter Grier
Tom Philpott

Advertising adv@afa.org

Advertising Director
Patricia Teevan
1501 Lee Highway
Arlington, Va. 22209-1198
Tel: 703/247-5800
Telefax: 703/247-5855

Industry Relations Manager
Jennifer R. Anderson • 703/247-5800

US and European Sales Manager
William Farrell • 847/295-2305
Lake Forest, Ill.
e-mail: BFarr80708@aol.com

BPA Circulation audited by
Business Publication Audit

the war strategy, when many others thought the war plan flawed.

All that said, I concede to having been surprised and of course delighted at just how overwhelming our victory was and admire our troops as well as General Franks and Secretary Rumsfeld and all others involved for a remarkable wartime achievement.

Michael O'Hanlon,
Senior Fellow, Brookings Institution
Washington, D.C

Before the Thunderbirds

"Thunderbirds at 50" [June p. 64]—fine article, great pictures, but I think at least a mention should be made of the T-birds forerunners: the "Skyblazers of USAF." Flying F-80s, these pilots did a marvelous job.

I was there to see them. The Patillo twins (wingmen) were featured on the cover of the *Saturday Evening Post*, and the whole team was praised in the article inside. Larry Damewood flew slot and Harry [Evans] was lead.

Great team, great pilots. They deserve a nod since they started the whole thing.

Col. David E. Opfer,
USAF (Ret.)
Lookout Mountain, Ga.

RED HORSE

In the June issue, I finally see part of the respect that the RED HORSE units have long deserved. Having been a proud member of some RED HORSE units in [Vietnam] from 1968 through 1973, I have seen just what a high caliber of people I was so fortunate to have been associated with.

Now they are even being permitted to prove their abilities by being airborne. [See "Aerospace World: Airborne RED HORSE Saddles Up," June, p. 8.]

MSgt. Richard F. Coffelt,
USAF (Ret.)
Harvey, La.

Praising CAP

It was most gratifying to read [Bruce D.] Callander's article ["The Citizen Air Fleet," June, p. 76] on the Civil Air Patrol, about one of the greatest volunteer organizations in the world. I began my membership in the patrol as the 38th cadet in the organization, when I joined in October 1942 with the Robbinsdale Squadron 711-4 Minnesota Wing, and have been a member ever since. The only time I was away was when I served several tours of duty overseas.

The organization and technology has changed considerably since those early days of the patrol, but it has survived the many trials and tribula-

Handcrafted Ready-Made Museum Quality Mahogany Aircraft/Ship Models
LET US CUSTOM MAKE YOUR AIRCRAFT/SHIP
www.motionmodels.com 1-800-866-3172

The largest catalog selection & website of custom & ready-made ships & aircraft anywhere. Catalog has over 1200 models in COLOR. Specializing in CUSTOM MADE & cataloged models. Vets & active, let us make you what you served on or flew. GIANT 120-page, full-color catalog \$8.00 (refundable). Layaway plans available. Flyers, Sailors, Collectors, we talk your language. Email: Joel@motionmodels.com

Motion Models
1-800-866-3172 • (OVERSEAS CALLERS) 1-954-344-8512 (8870 FAX)
2141 N. University Dr. #359, Coral Springs, FL 33071-6134

tions in support of our community, state, and nation. The article pays homage to the many members who served, some who gave the ultimate sacrifice for the welfare of our great country, which we should be grateful for during our darkest hours.

It has been noted by many prominent leaders in the military that CAP is on the same level as our active, Reserve, and National Guard [personnel]. Even though we do not receive monetary things, we do cherish the feeling of helping our fellow citizens in many ways through our search and rescue, aerospace education of the country, and much more.

I sincerely hope that more articles of this magnitude will follow as we need the support and knowledge that we are there to serve.

Lt. Col. Thomas J. O'Connor,
CAP
Rosemount, Minn.

AWACS Was There, Too

I'm compelled to issue a minor correction to the account of 9/11 rendered by Maj. Gen. Richard Bowling (CAP commander). [See "The Citizen Air Fleet," June, p. 76.] He asserted that on that fateful day when nearly all air traffic was grounded, "it was us [Civil Air Patrol] and the F-15s and F-16s and that was it." No doubt, CAP's role was historic and significant, however there was another aircraft in the sky that day—the E-3 Sentry (AWACS).

Airborne crews comprised mainly of students and a few instructors rapidly transitioned from eight-hour training sorties to 18-hour air sovereignty profiles in the air—and in minutes. This "turn-on-a-dime" ability reinforced the point that the key to rapid response in a crisis situation is not to flood the skies with pencil-beam

fighter radars but world-class airborne command and control coupled to the globe's finest airborne sensor platform.

For the first few hours of 9/11, the terrorists operated within our decision cycle, forcing us to react. AWACS played a critical role in reversing that advantage, enabling our leadership to take proactive measures, and ultimately deterring any future acts of terror. Within the next 18 months the Taliban and Saddam Hussein also got front row seats in the theater of command and control excellence, as the new doctrine of air dominance was orchestrated to perfection by the E-3 and her crews.

Capt. Geoffrey F. Weiss,
USAF
Tinker AFB, Okla.

Cover to Cover

I have received and am reading with great interest the June *Air Force Magazine*. As I always do, I am reading it from cover to cover.

Whenever I receive an edition of *Air Force Magazine*, I am stunned in the most positive way by its extraordinary quality and fascinating and captivating material across the board and by its relevance—current, past, and future.

We members of the Air Force Association are most fortunate to have *Air Force Magazine*. Kudos to you and to your staff.

Maj. Gen. Richard T. Boverie,
USAF (Ret.)
West Palm Beach, Fla.

Sign Me Up, Again

I retired too early! I was really impressed and pleased with your June issue of *Air Force Magazine* and the articles of real interest and valuable reading.

I especially enjoyed the images of Gulf War II ["Power and Precision," p. 32], and the "Thunderbirds at 50" [p. 64] brought home some great memories of my very early career when the T-birds were part of a South American goodwill tour in 1953 or 1954, and they stopped by Howard Air Force Base in the Canal Zone. Part of that tour was a young Air Force major, Chuck Yeager, flying an F-86.

CMSgt. John E. Schmidt Jr.,
USAF (Ret.)
Tallahassee, Fla.

More on Azrael

Seeing the photo of AC-130A, S/N 54-1630, in the June issue [p. 88] of *Air Force Magazine* took me back to the fall of 1968 at Ubon Royal Thai Air Base.

Then, as one of the first aircraft commanders of the newly formed 16th Special Operations Squadron, I had the privilege of flying 630 on my first night mission over the Laotian Trails.

For the next 12 months I probably flew Azrael (630) on 100 of my 138 missions while with the 16th. We were usually tasked with six missions each night, and, in a five aircraft squadron, that meant turning aircraft to fly a second mission. With battle damage

and out of commission airplanes, those that were flyable compiled upward of 500 missions over the flak filled skies of Laos during our year. 630 flew at least that many missions, and its crews were credited with the destruction of over 1,000 enemy trucks. There were times when our gunships returned with battle damage, and 630 was not spared that experience. 54-1630 was one of the first C-130s off Lockheed's production line, and it served our country and the Air Force well.

I am pleased that Azrael will continue to serve in the Air Force Museum as a memorial to the AC-130 gunship program.

Col. William J. Schwehm,
USAF (Ret.)
Lakewood, Wash

"Going Off"

Regarding the new Air Force Memorial design ["A Memorial on the High Ground," April, p. 72]: I can just hear the Army and Navy (especially the Marine Corps) now: "Yep. That's the Air Force, all right—going off in all directions."

Lt. Col. Jim Beavers,
USAF (Ret.)
Fort Walton Beach, Fla.



Air Force Association

1501 Lee Highway • Arlington, VA 22209-1198

Telephone: (703) 247-5800

Toll-free: (800) 727-3337

Press 1 if you know your party's extension.

Press 3 for Member Services.

(For questions about membership, insurance, change of address or other data changes, magazine delivery problems, or member benefit programs, select the "Member Services" option.)

Or stay on the line for an operator to direct your call.

Fax: (703) 247-5853

Internet: <http://www.afa.org/>

E-Mail Addresses

Field Services fldsvcs@afa.org

Government Relations grl@afa.org

Industry Relations irl@afa.org

Information information@afa.org

Member Services service@afa.org

Policy & Communications (news media)
..... polcom@afa.org

Magazine

Advertising adv@afa.org

AFA/AEF Report afa-aef@afa.org

Editorial Offices afmag@afa.org

Letters to Editor Column..... letters@afa.org

Aerospace Education

Foundation aefstaff@aef.org

Eaker Institute eaker@aef.org

Air Force Memorial Foundation ... afmf@afa.org

For individual staff members
first initial, last name, @afa.org
(example: jdoe@afa.org)

AFA's Mission

To advocate aerospace power and a strong national defense.

To support the United States Air Force and the Air Force family.

To promote aerospace education to the American people.



Dick Jonas

www.erosonic.com

*The songs we sang
About the planes we flew
And the people we knew
In the wars we fought*

183 Songs on 12 CDs
plus a book with lyrics and war stories



Now available at

**Air Force Base Exchanges
everywhere**

FEATURED ARTISTS

Dick Jonas, Toby Hughes
Irv LeVine, Bull Durham,
Chip Dockery, Saul Broudy,
Bill Ellis, Chuck Rosenberg
and Angela Jonas

Also available from . . .

EROSONIC
2001 Mtn View Glen
Ft Mojave AZ 86426

. . . and Amazon.com

Titles include . . .

| | | |
|---|----------------------|------------|
| Yankee Air Pirate | Blue Four | Buff |
| Nickel On the Grass | Marauder | Bronco |
| The Girl I Left Behind | Swamp Fox | Thud Pilot |
| Boozin' Buddies | Strike Eagle | The MiG-21 |
| Itazuke Tower | Peacemaker | Danny Boy |
| Hey Mr Taliban | Cold Warriors | Teak Lead |
| My Husband's a Colonel | Happy SAC Warrior | |
| God Bless America | Raggedy-Ass Militia | |
| What the Capt Means | Cold Black DC Wall | |
| Korean Waterfall | Crack Went the Rifle | |
| The Last Fighter Pilot | Wolfpack's Houseboy | |
| RBAAB: The Red-Bloded, All-American Boy | | |

. . . plus 154 more . . .



Washington Watch

By John A. Tirpak, Executive Editor

Warthog Wars, the Army Leadership Makeover, Global Shift in US Forces

Close Air Support Criticisms

Surprisingly, close air support has popped up again as an issue in Washington.

Air Force Secretary James G. Roche has said on numerous occasions that CAS is one of the most—if not the most—important of the Air Force's missions. And he has consistently couched the service's new F/A-22 fighter as a platform that can stealthily penetrate enemy defenses and provide support to special operations troops fighting behind enemy lines.

Yet, USAF leaders find themselves addressing new claims that the service is "short-shrifting" CAS by planning to retire its A-10 fleet.

A *New York Times* opinion piece claimed the Air Force intends prematurely to retire the Warthogs because it "deeply loathes" the close air support mission. USAF leaders said that is just wrong.

The May 27 op-ed, written by Robert Coram, said Air Force leaders want to get rid of the A-10 because of their "philosophical aversion to the close air support mission." Coram praised the A-10's low-level CAS success in the two Gulf Wars and charged that USAF would be putting ground troops "in grave danger" by retiring the 23-year-old fighter. The A-10 is a thorn in the Air Force's side, Coram charged, because it does not perform strategic bombing, the doctrinal "foundation" of the air service.

"For the white-scarf crowd, nothing is more humiliating than being told that what it does best is support ground troops," Coram asserted. He demanded USAF demonstrate "long-term commitment to supporting our men and women in the mud" by preserving the A-10 and building new airplanes like it.

The source of Coram's ire was a memo penned by Maj. Gen. David A. Deptula, Air Combat Command's plans and programs director. It, said Coram, was proof an A-10 kill was in the works.

ACC chief Gen. Hal M. Hornburg rebutted Coram's claims in a letter to the *Times*, stating that the service had increased, not decreased, its CAS support. He noted that 78 percent of airpoints attacked in Operation Iraqi Freedom supported ground forces. "The capability the A-10 brings to the joint force is one of our top priorities, so much so that we are building a concept of operations that will ensure that every one of our Air Force weapons-delivering aircraft will possess the capability to conduct close air support in the most demanding threat environments," he added.

Deptula was equally adamant in an interview with *Inside the Air Force*. He said, "Close air support is a mission, not an airplane."

Both USAF leaders pointed out that in Iraq, as in Afghanistan, the A-10 was not alone in flying CAS missions. Said Hornburg, the Warthog "did a superb job in Iraq providing support to our ground forces, as did the B-1, F-16, B-52, and F-15E."

Hornburg also noted that while the A-10 will serve for many years to come, it "will not last forever."

It is, in fact, currently in line for two upgrades. It was



The A-10: loved, not "loathed."

USAF photo by TSgt. Michael D. Morford

those upgrades that were the centerpiece of Deptula's memo. He had ordered subordinates to study the impact of cutting back on the upgrade programs as a normal part of upcoming budget drills.

Those upgrades—one to extend its service life from 8,000 hours to 16,000 hours and another to give it enhanced precision weapons capability—have shot up in price from \$300 million to more than \$1 billion. That brought the whole upgrade program under scrutiny.

According to Lt. Gen. (sel.) Daniel P. Leaf, who was the Air Force's director of operational capability requirements, these budget drills are an annual occurrence. Leaf, who was also the Air Force liaison to ground forces during Gulf War II, told *Inside the Pentagon* that he objected to Coram's "moral tone" which suggests "there's a loathing of the A-10 and the mission."

He added, "In my view, that's just wrong."

Rumsfeld and the Army

Defense Secretary Donald H. Rumsfeld's recent choices for new Army leaders suggest he wants to accelerate changes in that service. It may also indicate his approval of Air Force transformation efforts.

In May, Rumsfeld picked Air Force Secretary James G. Roche to move over to be the Army's top civilian leader.

In June, Rumsfeld took the further unprecedented step of tapping a retired Army four-star to be the Army's new military chief. He bypassed serving three- and four-star generals after his top two picks—Army Vice Chief of Staff Gen. John M. Keane and US Central Command head Gen. Tommy R. Franks—turned him down. Instead of digging deeper into the Army ranks, he proposed the return of retired Gen. Peter J. Schoomaker.

Both posts require Senate confirmation.

The choices make clear that Rumsfeld plans to speed up his efforts to transform the Army into a smaller, lighter, and more mobile force.

Roche served as a naval officer and, after retirement,

as an executive in the aerospace industry, where he earned a reputation for turning around ailing organizations. As Air Force Secretary, he has been a champion of systems that directly connect airpower with troops on the ground and other efforts to instill a "jointness" culture in USAF.

Rumsfeld forced the previous Army Secretary, Thomas D. White, to resign in the spring. White, himself a former Army one star, clashed with Rumsfeld over cancellation of the Crusader artillery system, which

US Army photo by Pfc. James Matise



Rumsfeld names new leaders for struggling Army.

Rumsfeld decided was too heavy, and on other reforms.

The defense chief's goals have met with stiff resistance from Army traditionalists who favor heavy armor, lots of troops, and self-reliance for things like air defense.

On the other hand, Schoomaker spent most of his career in special operations and headed the joint US Special Operations Command. Since retiring in 2000, he has been an advisor to Rumsfeld and also advised Franks on planning the wars in Afghanistan and Iraq.

Schoomaker has said in press interviews that he foresees fewer all-out wars in America's future and more short-duration conflicts, heightening the reliance on special operations-type forces—lighter and more mobile.

Senior Pentagon officials say Rumsfeld is considering reducing the Army from 10 active duty divisions to eight and possibly even abolishing the division as its main organizational unit. In place of the 15,000-troop divisions could be "battle groups" of 3,000-5,000 troops, each able to be self-sufficient without an entire division apparatus to support it. Combatant commanders could then assemble these tailor-made modules more easily into joint operations.

New Worldwide Deployments

The Administration is rethinking areas of responsibility for the major overseas US combatant commands. It has already indicated it will likely shift some 70,000 troops from their longtime garrisons in Germany and elsewhere in Europe to new, bare-bones bases ranging from the Near East to Central Asia.

The shift would place US troops closer to the areas where they might be expected to have to fight on short notice, particularly in the war on terrorism.

Defense chief Rumsfeld said the Pentagon is reviewing the "seams" between US Central Command, US Eu-

ropean Command, and US Pacific Command. The central issue is the problems those artificial boundaries pose.

The Defense Department is asking itself, "How can we best arrange ourselves ... in the most cost-effective way?" Rumsfeld said. The existing structure of bases and troops, particularly in Europe, he described as a "legacy" of the Cold War, and probably obsolete, since the Soviet Union "doesn't exist anymore."

A contingent of mayors from German cities and towns where US forces are based promptly visited Capitol Hill seeking reassurances that the troops would not leave. However, they were told that up to 70,000 troops could, indeed, be realigned but that the major air hub at Ramstein AB, Germany, would probably not be affected.

"It makes no sense to pick that up and move it 500 miles to the east," a Pentagon official told *Air Force Magazine*. When measured against the potential advantages of being somewhat closer to the Middle East and Central Asia, the cost of "rebuilding that capability in, say, Poland ... doesn't make the cut."

Included in the review are new facilities in Bulgaria, Kyrgyzstan, and Qatar—from which US forces have operated on an expeditionary basis since the war in Afghanistan. US facilities on Guam would also play a larger role, as a major hub for US forces in the Pacific.

The new bases—dozens are being looked at—might not host large numbers of troops or forces, but might be kept in "caretaker status" until needed. Thus, only a small contingent of personnel would staff them most of the time.

US officials said the troop realignments are not intended to punish Germany, Belgium, Turkey, and other countries for their less-than-full support of the US action in Iraq.

NATO, itself, is in the midst of an overhaul of its operations, and, in June, member countries agreed to a 40 percent base structure cut.

The alliance expects these efforts to help it to respond to crises more rapidly and plans to divert funds toward badly needed capabilities, such as improving airlift, communications, and precision attack capability among the European members.

At their June summit in Brussels, NATO countries also agreed to pick up some of the stabilization functions in Iraq. All 19 members reached consensus.

NATO's new Response Force is expected to grow to a 21,000-troop organization geared to no-notice, "forced entry" operations. It will be the centerpiece of the new NATO and serve as the focus for improvement in NATO capabilities. It will need to be supplied with airlift, leading-edge weaponry, and agile logistics for sustainment of at least 30 days.

What Is the China Situation?

The debate over a China threat flared anew with the release of a new report from the Council on Foreign Relations.

Last year, the Pentagon, in its annual report to Congress, outlined a China with a vibrant economy and a commitment to long-term military force improvements.

The Pentagon said: "China is developing advanced information technology and long-range precision strike capabilities and looking for ways to target and exploit the perceived weaknesses of technologically superior adversaries. In particular, Beijing has greatly expanded its arsenal of increasingly accurate and lethal ballistic missiles."

Part of that capability, according to the 1999 Cox

**THE MISSION MAY BE NEW,
BUT THE OBJECTIVE REMAINS THE SAME.**

Pratt & Whitney's main goal has always been to protect and support our troops as they head into harm's way. Advanced, dependable engines ensure that our jets are always ready and our people, both in the sky and on the ground, are always safe. Protecting lives begins long before troops move out.



Pratt & Whitney

A United Technologies Company

www.pratt-whitney.com



F-15



F-16



F-22



F-35



C-17



767



JSTARS



EA-6B



SUPPORT



report on China, came from theft of classified US national security technology.

Now a Council on Foreign Relations task force, headed by former Defense Secretary Harold Brown, maintains that despite China's ongoing attempts to modernize its military forces, its capabilities are about 20 years behind those of the United States.

In introducing the report, which is titled simply "Chinese Military Power," Brown said China "is at least two decades behind the US in military technology and capability. And, if the US stays on course, in terms of its military development and expenditures, the balance will continue to be decisively in the US favor."

The CFR task force sees no need to panic at the prospect of a militarily improving China, but it then cautions against underestimating China's military as backward.

One of its goals, according to the report, is to "avoid the wide and unfounded swings" of judgment that often characterized Cold War debate of Soviet military power.

The report said that overreacting to capabilities China "does not have and will not attain for many years could result in the misallocation of scarce resources."

It continued, "Overreaction could lead the United States to adopt policies and undertake actions that become a self-fulfilling prophecy, provoking an otherwise avoidable antagonistic relationship with China that will not serve long-term US interests."

At the opposite extreme, the report concluded that underreaction "might allow China someday to catch unawares the United States or its friends and allies in Asia."

Brown said that military spending has grown rapidly in China over the last 13 years but that it will "take time" for China to translate its rapidly advancing commercial technology into military capability. He specifically noted that China has yet to be able to develop and build advanced aircraft on its own but rather buys them from Russia.

"It suggests that they're not yet ready to stand on their own feet," said Brown. "And it is one reason why we recommend a continuation of the denial of arms and military technology transfers to China."

According to Brown, China also needs to undergo a massive overhaul of its training, strategy, and tactics, a process which he noted took the US Army more than 15 years to achieve.

China's stated goal of bringing Taiwan back under its control drives much of China's military spending, "or, at a minimum, drives the rhetoric associated with those expenditures," said Adm. Joseph W. Prueher (Ret.) a former commander of US Pacific Command who was vice chairman of the study.

Brown said that while China's industrial espionage program is robust, their military advancement, particularly in rockets and missiles, is largely indigenous.

"I do not think that their improvements in military capability are primarily driven by espionage or even largely driven by that," Brown asserted.

Prueher added, "It's almost impossible to steal systems integration capability by espionage."

Playing Chicken in Korea

Some see the past year's anti-American protests that broke out in South Korea as the impetus for the Administration's decision to realign and possibly reduce US military strength on the Korean peninsula.

US forces in South Korea have been the subject of numerous protests since two US Army sergeants in an armored vehicle accidentally ran over and killed two South Korean girls during a military exercise in June 2002.

Many South Koreans want the US soldiers to stand trial in a South Korean court. A US military court found the soldiers not guilty of manslaughter charges.

This has played out against the backdrop of North Korea brandishing a growing nuclear weapons capability.

Pentagon leaders insist any potential drawdown of US forces in South Korea is purely part of an ongoing assessment of forces worldwide.

DOD plans to back its forces away from the Demilitarized Zone separating North and South Korea and redeploy those forces to other locations on the peninsula. The move would affect about 6,000 troops now deployed along the DMZ, where they have been since the Korean War cease-fire of 50 years ago. The troops would move back to positions about 75 miles south of the 38th parallel.

An agreement on making the troop move was reached during US-South Korean meetings in Seoul in early June. No timetable was announced.

The US troop redeployment will remove the US as a trip wire should North Korea undertake any cross-border action, which would immediately involve the US as a combatant. Operationally, however, the move would make for a more effective counterattack if North Korea were to launch a surprise invasion of the South. Troops now deployed along the DMZ are outnumbered by North Korean forces arrayed on the other side of the line.

New bases for American troops will be outside the range of the largest North Korean artillery.

Once begun, the redeployment would take several years to complete, said Pentagon officials.

Additionally, the US will spend "a substantial amount



AP photo/Katsumi Kasahara

North Korean soldiers will still face nearby US forces.

of money" over the next four years on about 150 separate defense initiatives to "enhance US capabilities here on the peninsula," Deputy Defense Secretary Paul D. Wolfowitz said of the realignment. The amount could be as high as \$11 billion.

US intelligence believes North Korea may already possess one or two nuclear weapons and have the capability to build as many as a dozen more. However, none has been tested and their reliability is in question.

The Bush Administration is said to favor economic sanctions against North Korea, since opening up direct talks is seen as "rewarding" North Korea for its poor behavior. A "surgical" military strike on North Korea's nuclear facilities is also not a preferred option, since it would be a de facto act of war and because North Korea's nuclear program is conducted at over a dozen facilities, making complete success more problematic. ■

Aerospace World

By Adam J. Hebert, Senior Editor

ANG Pilot Seeks Court-Martial

Shortly after the Air Force offered nonjudicial punishment in lieu of court-martial, Maj. Harry Schmidt, the Illinois Air National Guard F-16 pilot who mistakenly bombed Canadian troops in Afghanistan in April 2002, demanded to stand trial instead. Four Canadians were killed and eight wounded in the incident.

Schmidt said June 25 he wants to clear his name.

Lt. Gen. Bruce Carlson, commander of 8th Air Force, had reviewed the evidence and recommendations from an Article 32 hearing held earlier this year and, on June 19, had announced he would issue a letter of reprimand to Maj. William Umbach, the lead F-16 pilot involved in the incident, and initiate Article 15 action against Schmidt.

Umbach, who did not release weapons, was cited for "leadership failures." Carlson also recommended the service accept Umbach's request to retire.

Schmidt allegedly failed to follow an order to make certain his target was not friendly and to "stand by," as instructed by an Airborne Warning and Control System aircraft. He has maintained that there was no warning that coalition forces were in the area on night exercises.

For additional background, see "Aerospace World" news items: "Pilots Blamed in Canadian Deaths," August 2002, p. 16; "USAF Changes Tarnak Farms Disciplinary Authority," September 2002, p. 21; "Air Force Charges Two Pilots in Deaths of Canadians," October 2002, p. 19; "The Case of the ANG Pilots: Blame, Support, and Conflicting Testimony," February, p. 20.

USAF May Extend AEFs

The Air Force is considering a permanent change to the air and space expeditionary force rotation cycle, according to the head of AEF planning.

Maj. Gen. Timothy A. Peppe told *Stars and Stripes* that deployments may be extended to 120 days from the current 90-day AEF template. The Air Force already intends to use two temporary 120-day deployments to



USAF photo by Capt. Patricia Long

Maj. Craig Baker (left) and SSgt. Zach Porter measure the extent of damage inflicted by a precision guided munition on a Baghdad building used by Saddam Hussein's forces. The airmen are part of a team assessing PGM effectiveness.

Raptor Cuts Undermine "Buy to Budget" Plan

Both House and Senate lawmakers reduced USAF's request for F/A-22 Raptor funding in the Fiscal 2004 defense authorization bill. The move flies in the face of the "buy to budget" strategy and could signal that USAF will not be able to reach its fleet goal of 381 F/A-22s.

The Air Force sought \$3.7 billion to pay for 22 Raptors next year. The Senate authorization bill cut the F/A-22 budget request by \$217 million, effectively reducing next year's quantity to 20.

House authorizers also cut the 2004 request—by \$161 million—citing Fiscal 2003 program efficiencies as justification.

However, such efficiencies are at the heart of the buy-to-budget agreement USAF reached with OSD. Under the agreement, USAF can buy as many Raptors as possible for a set amount of money each year. OSD views that as incentive for the service to keep the cost of the airplane down.

For instance, in 2003 the Air Force initially requested 23 Raptors but lowered the quantity to 20 when developmental problems forced the service to reprogram some funds from production to development accounts. USAF later determined that new efficiencies would allow the service to buy an extra aircraft in 2003 and remain within its budget.

Service officials had counted on the buy-to-budget strategy to enable them to eventually purchase 381 aircraft—the baseline number needed for its 10 air and space expeditionary force structure.

In addition to the amount House authorizers deem should be cut due to program efficiencies, they stipulated that improvements must be made to the aircraft's advanced software or they will remove another \$136 million from the F/A-22 account.

By mid-June, the Congressional appropriators had not yet finalized their versions of the 2004 budget.

help cover a reconstitution period for forces returning from duty in South-west Asia.

Going to a longer deployment would increase the time that personnel spend at their home base between AEFs, "and that would be a good thing," Peppe said.

Navy Eyes Longer Deployments

The Navy will extend the deployments of its carrier battle groups beyond the traditional six months if doing so will help meet wartime "surge" demands, said Adm. Vernon Clark, Chief of Naval Operations.

"I am not going to short-cycle one [carrier] home [just] to say, 'We made it in six months,' and then have a ripple effect through three or four more battle groups," Clark told reporters in June. "We're going to be able to deploy five or six [battle groups] any time [the President] wants to," he added.

During peacetime, the Navy typically has three of its carrier battle groups deployed at any given time.

Ability to surge does not mean the Navy will arbitrarily extend deployments, however. Clark noted there will be negative morale and recruiting consequences if routine six-month deployments become nine months long.

Promotions Imbroglio Ends

It took a commitment from the White House, but, on June 23, Idaho Sen. Larry E. Craig (R) agreed to release the last of the 212 Air Force officer promotions he had placed on hold.

The Air Force, in turn, had to meet with Craig to discuss adding more C-130 transports to the Air National Guard unit at Gowen Field in Boise. (See "Aerospace World: C-130s for Promotions?" July, p. 10.)

The June 23 releases were for 18 general officer promotions.

The dispute became public before Craig relented on promotions for more than a hundred lower-ranking officers.

According to Craig, the Air Force seven years ago promised it would base eight C-130 transports at Gowen Field. "In 1996, Idaho received four C-130s in what the undersecretary of the Air Force at the time said was the 'first installment' of eight aircraft," Craig said in a statement.

Since then, "I have secured over \$40 million in military construction dollars in anticipation of a full squadron" of eight aircraft, Craig added.

Plans Set for Tanker Basing

The Air Force in June announced

Report: Academy Lost Focus on Assault Problem

The Air Force working group looking into sexual assault allegations from current and former cadets at the Air Force Academy found no evidence of systemic acceptance of sexual assault, cadet mistreatment, or avoidance of responsibility among the academy leadership.

However, focus on the problem of sexual assault had waned in recent years, the group determined.

USAF General Counsel Mary L. Walker headed the group, which began its investigation in February. Walker released their report June 19.

It stated, "A number of cultural and process matters are problematic." They include the high incidence of alcohol use in assault cases and the lack of coordination between units responsible for responding to charges of sexual assault.

"Direct focus by the superintendents on sexual assault issues appeared to gradually lessen after 1997 ... [due] to competing demands," the report noted.

The cadet environment was also found to be troublesome, in that there exists a climate of "gender-based comments about women [and] off-color jokes," while cadets frequently place loyalty to their peers above values.

Overall, the report conceded, "It is difficult to establish the extent of the sexual assault issue at the academy." The academy defines and records assaults differently than the Air Force.

The working group recommended integrating all agencies responsible for responding to complaints and involving academy leaders in victim support and protection of privacy. Privacy and support were two areas where victims often misunderstood the process after they filed a complaint.

An independent Congressionally mandated panel was created in late May and held its first public hearing June 23. The seven-member committee, appointed by Defense Secretary Donald H. Rumsfeld, is headed by Tillie K. Fowler, a lawyer and former Republican Congresswoman. (See "Aerospace World: DOD Names Air Force Academy Review Panel," July, p. 15.)

One member of the panel—Amy McCarthy, a United Airlines pilot and academy graduate—already stepped down amid concerns over her ability to be impartial. She had been publicly skeptical of claims of rape by female cadets, according to the *New York Times* on the Web.

On June 26, McCarthy was replaced by Anita M. Carpenter, who is chief executive officer of the Indiana Coalition Against Sexual Assault and a noted victim's advocate.

Lockheed Martin, Boeing Face Off Over EELV

Defense giants Boeing and Lockheed Martin squared off in court when Lockheed filed suit June 10 against its longtime rival.

The lawsuit claims Boeing employees, one of whom previously worked for Lockheed, systematically stole proprietary information that helped Boeing win 19 of 28 lucrative Evolved Expandable Launch Vehicle contracts.

According to the suit, Boeing employees used inside information about Lockheed's EELV bid to ensure they could offer a "lower cost, technically superior proposal."

The result was "Lockheed Martin's ongoing loss of a significant portion of the Air Force space launch business over a 10-year period," adversely impacting Lockheed's future business prospects, the company alleged.

Boeing won all seven of the initial EELV launches and 19 of the first 28 missions. This was "seen by the marketplace as tacit endorsement of Boeing's launch vehicle over Lockheed Martin's, making it much more difficult" for Lockheed to compete for commercial launches, the lawsuit alleged.

Boeing also took action—in the court of public opinion. In an unusual move, the company placed full page ads in several nationally prominent newspapers the day before the lawsuit was filed, admitting that some employees had "behaved unethically" but defending the company's overall integrity.

In the ads, Boeing Chairman and CEO Philip M. Condit wrote that "the actions of a few individuals" are not representative of the company as a whole. However, as a large organization, Boeing is "not always perfect," Condit added.

Lockheed Martin noted in its lawsuit that at least one of the individuals accused of the industrial espionage was terminated for "possessing and distributing Lockheed Martin EELV-related proprietary documents during the EELV competition."

its preferred plan for basing the 100 KC-767 aerial refueling aircraft it expects to lease from Boeing. (See "100 Tankers," p. 64.) According to USAF's "tanker roadmap" the following bases will be affected:

- Fairchild AFB, Wash., will receive 32 KC-767s by 2010 and will get up to \$200 million in military construction funds.

- Grand Forks AFB, N.D., will receive 32 KC-767s by 2009 and \$176 million in construction funds.

- MacDill AFB, Fla., will receive 32 KC-767s by 2011 and some \$200 million in milcon funds.

- Robins AFB, Ga., will eliminate its existing tanker inventory, creating room for future missions.

The remaining four KC-767s will be backup inventory. The lease arrangement will also allow the Air Force to retire its 133 aged KC-135Es.

Air Reserve Component units at the following bases will transition from E model KC-135s to R models as part of the tanker realignment:

- Salt Lake City, Utah
- Bangor, Maine
- Pittsburgh, Pa.
- Forbes Field, Kan.
- McGhee Tyson ANGB, Tenn.
- McGuire AFB, N.J.
- Scott AFB, Ill.
- Sioux City, Iowa
- Beale AFB, Calif.
- Phoenix, Ariz.
- Selfridge ANGB, Mich.

The basing plan is contingent on Congressional approval of the tanker leasing plan.

Short War Cost Less

The relatively quick conclusion of major combat operations in Iraq meant the war cost less than government projections.

"The business plan for the war was roughly as successful as the military plan," Mitch Daniels, outgoing director of the Office of Management and Budget, told *USA Today*. The expense projections "look pretty darn good" he added.

Congress in March approved \$62.6 billion to pay for combat operations and deployments. However, compared to prewar projections, there were fewer precision weapons expended and there were fewer oil well fires and fewer refugees to attend to than expected.

Lawmakers Want B-1s Back

In House and Senate versions of the Fiscal 2004 defense authorization bills, lawmakers proposed that the Air Force bring back the majority of the B-1 bombers the service plans to retire by Sept. 30.

The Military Is the Most Trusted US Institution

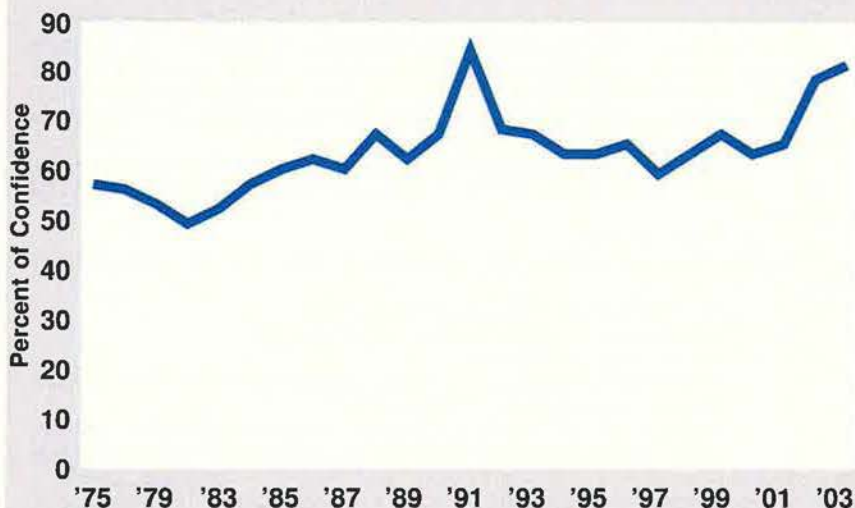
Americans are more confident in the military than any other US institution, according to a recent Gallup poll. In the 30th annual installment of Gallup's "Confidence in Institutions" survey, four-fifths of Americans have "a great deal" or "quite a lot" of confidence in the military, the highest level of trust of the 15 institutions included in the poll.

The military was also the most trusted institution among younger Americans aged 18-49. More than three-quarters of the younger demographic expressed confidence in the military.

The only areas to receive votes of confidence from more than half of those surveyed were the military, the police (61 percent), and the Presidency (55 percent). Organized religion and banks rated 50 percent each.

Trust in the military has made great strides over the last 30 years. When the military was first added to the survey in 1975, with memories of Vietnam still fresh in people's minds, only about 60 percent of Americans expressed confidence in the military. Six years later, shortly before the Reagan Administration's defense buildup, the number had dropped even lower to 50 percent.

The highest rating Gallup has recorded thus far for confidence in the military came in 1991, after Operation Desert Storm, when it reached 85 percent.



Space Struggles With Four Systemic Challenges

Military space programs face four systemic problems that historically have resulted in "the majority" taking extra time to develop and going over budget, according to two June reports from the General Accounting Office.

Some of these problems are being addressed in new military space programs, but some of the same hurdles remain. Common problems include:

- Poorly defined requirements or changing requirements once a program has begun.
- Bad investment practices, such as optimistic cost estimates and shifting funds.
- Poor acquisition strategies, such as reducing competition to meet schedules.
- Reliance upon poorly understood technologies, especially software.

GAO found that the Space Based Infrared System-High missile warning system and the Advanced Extremely High Frequency military satellite communications system suffered from all four of these types of problems.

The Congressional watchdog agency did report that DOD has made some progress in addressing these root causes.

Further, GAO noted that "many satellites launched over the past two decades have lasted longer than expected." It cited the Defense Support Program satellites that currently provide missile warning as having operated "well past design lifetime."

Veterans Task Force Issues Report, Sparks Fly

Why do the Department of Defense and Department of Veterans Affairs conduct separate physical exams of veterans, one before discharge and one afterward?

What is the reason for separate purchasing systems? Why are VA and DOD medical record systems incompatible?

According to a federal task force study, Congress and the President should demand closer coordination of staff, facilities, and other resources of these two mammoth health care systems.

The 129-page report of the President's Task Force to Improve Health Care Delivery for Our Nation's Veterans, delivered to President Bush on May 28, recommends greater collaboration to control a combined \$50 billion cost and to ensure a "seamless transition" for veterans from military to VA health care.

One recommendation would set the VA budget high enough to fully fund health care for enrolled veterans in Priority Groups 1 through 7. Group 1 veterans have service-connected disabilities of 50 percent or more. Group 7 veterans have no service-connected ailments but are relatively poor, having incomes above a national VA means test but below a government geographic index of pay adequacy.

The number of enrollees in Groups 1 through 7 grows by 360,000 a year.

Left out of the new funding scheme would be Group 8 veterans, who have no service-connected ailments and who are not in poverty. These veterans first were offered access to VA health care in 1998 in return for agreeing to co-payments. Their enrollment has grown by 220,000 a year and was suspended in January to ease an access problem for all veterans.

The report urges the President and Congress to work together to end this "unacceptable" access status and an obvious mismatch between demand and resources.

The report also calls for:

- Making electronic medical records between DOD and VA compatible by Fiscal 2005.

- A joint DOD-VA formulary for prescription drugs.

- Joint procurement of medical services and equipment.

- More joint construction ventures.

The task force was formed two years ago to recommend ways in which DOD and VA could better collaborate on veteran care.

Rep. Christopher H. Smith (R-N.J.), chairman of the House Veterans' Affairs Committee, described the task force report as "magnificent" and moved quickly on the controversial full-funding provision. (See "Action in Congress," p. 20.)

However, the plan was attacked by another senior member of the House panel, Rep. Steve Buyer (R-Ind.). Buyer charged that the panel had been "hijacked" by several task force members with close ties to large veterans service organizations. How else, asked Buyer, could one explain the task force recommendation to pay for health care for all enrolled veterans, including those with no service-connected injuries?

Buyer said in an interview that the report was not responsive to the goals set out in its charter but had instead been guided by political considerations.

What is clogging the VA system, said Buyer, is not a shortage of money but the fact that Congress in 1996 made a big "mistake" by approving open enrollment of all veterans. Buyer noted that he himself had gone along with this plan.

Buyer recalled that the Congressional Budget Office had warned of a looming mismatch between demand and resources, but the committee leaders and veterans groups "mocked" the predictions, believing costs would be kept within bounds by new efficiencies, co-payments charged to some veterans, and reimbursements from employer health insurance plans. None materialized, said Buyer.

Priority 7 and 8 veterans, those with no service-related disabilities, cost the VA \$2 billion last year, about 10 percent of overall costs. Rather than admit open enrollment was a mistake, the task force and veterans group now argue, said Buyer, "just give us more money."

—Tom Philpott

The action would require the Air Force to return to service 23 of the 32 B-1s destined for retirement.

The Air Force opposes the move, noting in a statement that it would cost more than \$1.1 billion through Fiscal 2009 to retain the aircraft. This

funding is "simply not available elsewhere in the Air Force budget," according to a USAF spokesman.

The lawmakers authorized \$20.3 million "to begin the regeneration of the 23 B-1B aircraft," the House report on the bill states.

An Air Force official described the \$20.3 million figure as "nothing," given that it is less than two percent of the total funds needed to keep the B-1s in service. USAF decided to draw down the B-1 fleet from 93 to 60 aircraft to free up funds needed to upgrade and sustain the remaining aircraft in the fleet.

According to the USAF statement, forcing the Air Force to bring back the bombers without properly funding them "threatens to undo all the gains" USAF has made in B-1 reliability and performance.

USAF Faults Pilots, ATC

On June 11—more than two years after two F-15Cs crashed in Scotland, killing both pilots—the Air Force released accident investigation findings that faulted the pilots and a Royal Air Force air traffic controller.

USAF investigators determined that a breakdown in "terrain avoidance responsibilities" led to the deadly March 2001 accident.

Lt. Col. Kenneth Hyvonen and Capt. Kirk Jones were on a low-level training flight when they flew into a mountain.

The F-15C Eagles, from RAF Lakenheath, UK, crashed into the snow-covered Cairngorm Mountains after the pilots descended below a safe altitude while lacking "positive visual contact with the ground," the accident board determined.

It was four days before the bodies of both pilots were recovered. (See "Aerospace World: Two USAF F-15s Crash in Scotland," May 2001, p. 14.)

The release of the investigation report was delayed for more than a year by the court-martial of the British air traffic controller, who was acquitted of professional negligence.

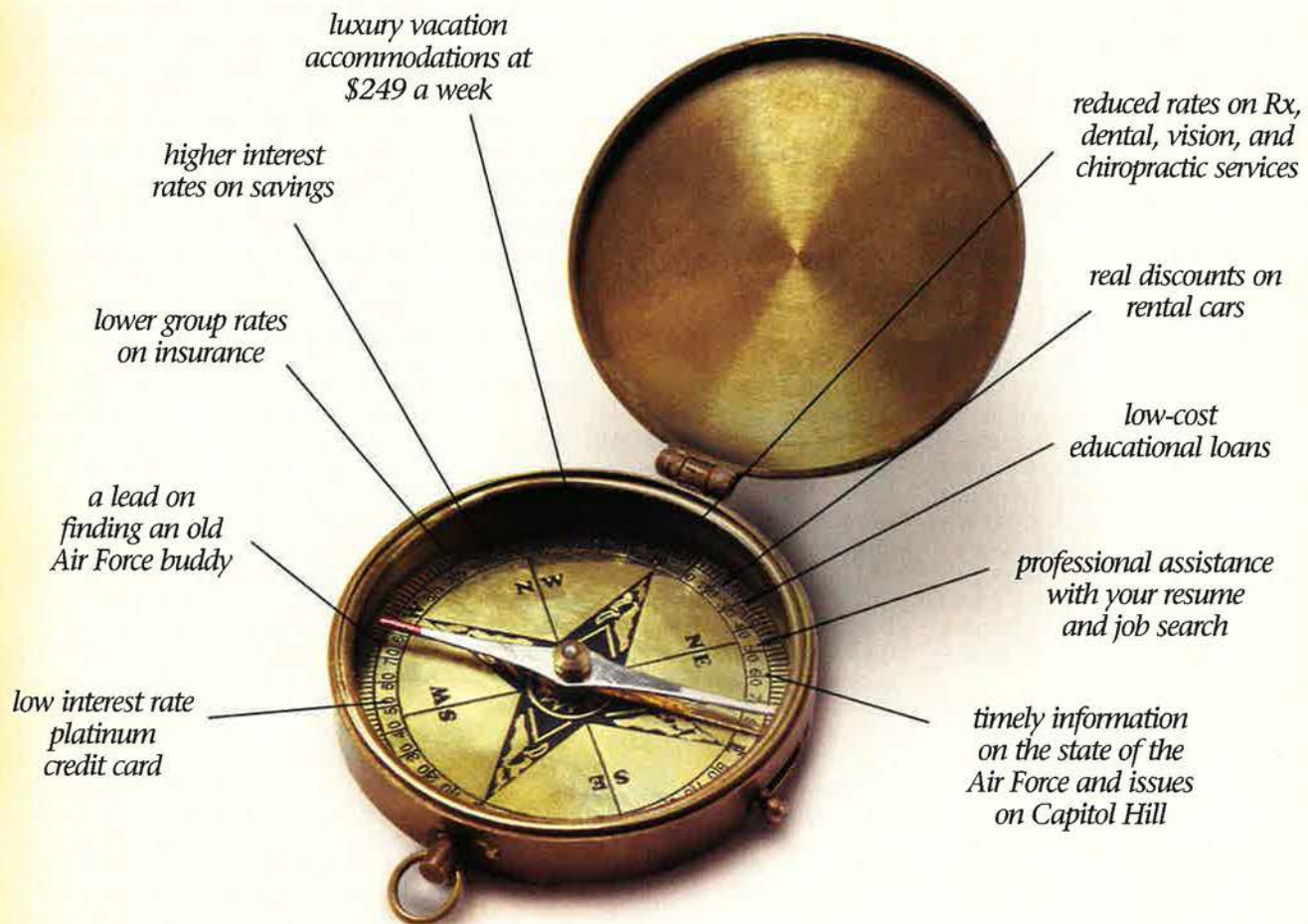
Navy Down One Carrier

USS *Constellation*, the Navy's second-oldest aircraft carrier, will be retired this month. The retirement will leave the sea service one carrier short of its standard level for about a year, as *Constellation's* replacement, *Ronald Reagan*, is still under construction.

Ronald Reagan is not expected to reach its home port at NAS North Island, Calif., until 2004. The new carrier will first deploy sometime in 2005, according to Navy plans.

Constellation served a seven-month tour in support of Gulf War II, during which it launched 1,500 combat sorties that delivered 1.3 million pounds of munitions.

Where Can You Get...



...Closer Than You Think.

All these time and money-saving opportunities are available to you through your Air Force Association Member Benefits. And new products and services are continually added to make membership even more valuable. For an update, visit Member Benefits online or call toll free.

USE YOUR AFA MEMBER BENEFITS OFTEN!



Visit www.afa.org and click Member Benefits

Call toll free
1-800-727-3337
weekdays 8:30 AM
to 5:00 PM ET

And please: if it's time, renew now. If you're not a member, join today. If you have a friend/relative who might like the best association benefit package while supporting The Force Behind The Force, pass this information on.

News Notes

By Tamar A. Mehuron, Associate Editor

■ USAF plans to base eight C-17 airlifters in Hawaii, primarily to transport a planned Army brigade of 300 Stryker armored vehicles. The aircraft are expected to arrive in Fiscal 2006.

■ Pentagon officials approved a \$900 million project to construct a high-speed fiber optic network connecting US defense command posts around the world.

■ Rough times for the US semiconductor industry threaten the development of new military systems, said Sen. Joseph I. Lieberman (D-Conn.) in a June white paper. He asserted that China and other East Asian countries use government subsidies to boost their computer chip manufacturing base at the expense of US companies. If the trend continues, he said, the US will eventually become dependent on potentially unreliable foreign sources for high-end semiconductors necessary for advanced weapons systems. He suggested that tax breaks could help strengthen the US manufacturing base.

■ The Senate on June 23 confirmed Lt. Gen. John W. Rosa Jr. to be the new superintendent at the Air Force Academy.

■ The Army plans to develop uniforms and helmets wired with sensors and connected to a common network. General Dynamics, which received a contract for up to \$3 billion June 12, is to provide the first

prototype by 2006 and outfit the first soldiers by 2010. The helmet will hold a camera, Global Positioning System antenna, and receivers. Images will be viewed via an eyepiece.

■ In June, Air Force One—for the first time since Gulf War I in 1991—flew across Iraq as it transported President Bush to the Middle East.

■ Pentagon spokeswoman Victoria Clarke, assistant secretary of defense for public affairs, resigned June 20, citing a desire to spend more time with her family. Lawrence Di Rita, a special assistant to Secretary of Defense Donald H. Rumsfeld, is serving as acting spokesman.

■ On June 12, Tallil AB, Iraq, received its first commercial cargo aircraft since coalition forces secured the base during Operation Iraqi Freedom. Other military-contract commercial airplanes are expected to follow. Falcon Express Cargo Airlines from Dubai, United Arab Emirates, is scheduled to make three deliveries per week, according to Maj. Seann Cahill, commander of the 407th Expeditionary Logistics Readiness Squadron.

■ DOD plans to move its Internet Protocol 4-based systems and equipment to IP 6 by 2008, said John P. Stenbit, DOD's chief information officer. The new version, which expands IP address space, improves security, eases mobile communications, and generally enhances ser-

vice, will enable the Pentagon to integrate elements of its Global Information Grid and move toward "net-centric warfare and operations."

■ President Bush on June 5 established a spectrum policy initiative to develop recommendations to improve radio frequency spectrum management policies and procedures for the federal government and to address state, local, and private spectrum use.

■ Two USAF organizations on June 4 received the David Packard Award for Acquisition Excellence. The Joint Direct Attack Munition Joint Project Office delivered JDAMs in half the time and at half the cost as projected. The Passive Attack Weapon quick reaction capability team delivered a complete and operationally tested system in less than 100 days.

■ On June 13, Maj. Jeffrey Olesen, a U-2 pilot, received the 2002 Koren Kolligian Jr. Trophy for his actions to safely land his aircraft when the engine malfunctioned during a 2001 Operation Southern Watch mission over Iraq. After exhausting established tech procedures to fix the problem, he had to put the engine in idle, where it became stuck, causing the U-2 to operate like a glider. There was no checklist covering descent from the U-2's normal operating altitude of 70,000 feet with an engine in idle. Olesen is assistant director of operations for the 1st Reconnaissance Squadron, Beale AFB, Calif.

■ Retired MSgt. Trinidad Castinado on June 2 received the Air Medal, second oak leaf cluster, for his actions nearly 60 years earlier during a bombing mission over Germany. The original paperwork had been lost, but Castinado's supervisor at Kirtland AFB, N.M., who heard about the airman's heroism, prompted a search for records to confirm the award. On a 1944 bombing run to a key target in Germany, Castinado, a gunner on a B-24, gave his oxygen mask to the radio operator whose mask had failed to work and who had been ordered to bail out as the bomber climbed to 10,000 feet. Castinado parachuted from the bomber, despite the danger at that altitude, since the radio operator was more important to the mission.

■ The Library of Congress on May 22 celebrated Bob Hope's birthday with a special tribute. Hope, who turned 100 on May 29, performed for USO audiences through World War II, Korea, Vietnam, and the 1991 Gulf War. The library now has a permanent exhibit, "Bob Hope Gallery of American Entertainment," housing more than 85,000 pages of Hope's jokes and other material from his 80 years in show business.

USAF photo by Steve Zapka



A B-1B drops a Joint Standoff Weapon during a test mission earlier this summer. It was the first time the bomber had launched a JSOW, according to officials at the Air Force Flight Test Center, Edwards AFB, Calif.

Maintainers Set Record MC Rate

The 7th Bomb Wing at Dyess AFB, Tex., surpassed the standard 67 percent mission capable rate for B-1 bombers for 12 straight months. It's the first time a unit has set such a record for the B-1.

Maintainers began the record run last June and culminated it with a 76.1 percent MC rate in May, according to unit officials.

The MC rates are determined by the percent of a unit's assigned aircraft that are ready to perform missions.

The Dyess success rates were attributed to the increased funding for spares and parts that then began flowing through the pipeline.

"We have more parts on the shelf now, have less cannibalization actions, and less weekend maintenance duties," said CMSgt. Douglas Fournier, 7th Operations Group maintenance superintendent. He added, "Morale is the highest it's been in years."

USAF To Revise MC Rates

Air Force officials are developing new methods to calculate its mission capable rate goals to improve how the service buys, operates, and retires aircraft. They intend to submit the new methods to senior leaders by late summer.

According to *Defense News*, Gen. John P. Jumper, USAF Chief of Staff, ordered changes to be made to the current MC rate process during February's Corona meeting, a quarterly meeting of top Air Force leaders.

At the same meeting, Air Force Secretary James G. Roche established a new service panel to track aircraft as they fly and age. The intent is for the panel to certify the airworthiness of USAF aircraft.

Appropriators Cut Topline

The House Appropriations Committee allocated \$368.6 billion to defense in its version of the Fiscal 2004 spending bill—\$3 billion less than requested. The reason: DOD did not spend all it was given for the war in Iraq.

Committee chairman C.W. Bill Young (R-Fla.) said the allocation is an agreed-upon starting point for budget deliberations with Senate appropriators.

Major SRB Shift

USAF recently cut the selective reenlistment bonuses for 47 career fields and decreased the amounts in some 53 others. At the same time, it added or boosted SRBs for another 40.

The additions and increases took

DOD OKs V-22 Osprey Production

The V-22 tilt-rotor is ready to shift into high gear, senior defense officials say. Pentagon acquisition chief Edward C. Aldridge, who reviewed the program before retiring May 23, said the redesigned program has met all key performance parameters and reliability and maintainability standards. He declared the V-22 program sufficient to increase production "above the minimum sustaining rate."

Following two deadly crashes in 2000 that killed 23 Marines, the Osprey had design defects corrected and validated through intense flight tests and inspections, according to V-22 program manager Marine Corps Col. Dan Schultz.

Schultz told reporters June 19 that, for the past six years, the program has been at a minimum sustaining rate—11 aircraft per year—the lowest number manufacturer Bell Boeing can build per year and keep the production line open.

The program office is evaluating five different options for increasing the production rate, beginning in Fiscal 2005, Schultz said. Currently, the Pentagon's long-range spending plan calls for 11 tilt-rotors to be built in 2005, then 20 in 2006.

Aldridge said production will likely increase to "14 to 15" aircraft in 2005, based on "what's affordable" within the 2005 budget. He also directed officials to "define options" for enhanced capabilities by adding the Joint Tactical Radio System and Link 16 for improved communications.

Schultz said there is always money to be found in budgets for "great ideas," but there are no guarantees that funding will be made available in Fiscal 2005.

The V-22 is expected to replace a host of legacy helicopters, including Air Force Special Operations Command's MH-53 Pave Lows.

Schultz noted that AFSOC-specific testing also has been progressing well.

Strom Thurmond, 1902-2003

Strom Thurmond of South Carolina—the longest serving Senator in US history—died June 26 in Edgefield, S.C. He was 100.

He was born on Dec. 5, 1902, in Edgefield. After graduating from Clemson College in 1923, he became a teacher and, later, county school superintendent. He studied law and was admitted to the bar in 1930. He was elected a state senator in 1933, then pushed for fellow legislators to name him a circuit judge in 1938.

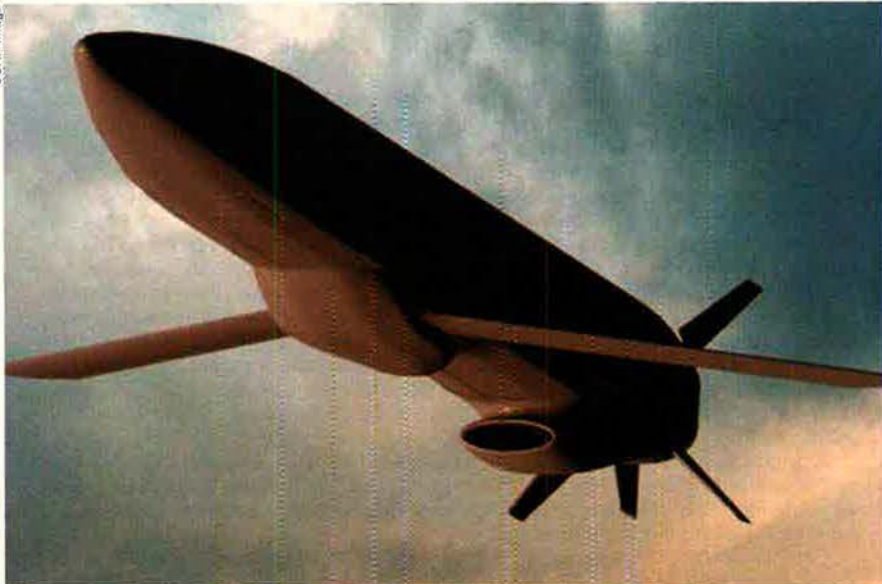
In 1941, Thurmond joined the Army as a captain in a civil affairs unit. On D-Day in 1944, as a lieutenant colonel, he landed in France by glider and captured German soldiers with a pistol. He received a Bronze Star for valor and the French Croix de Guerre.

He was elected governor of South Carolina in 1946. Thurmond went to the Senate in 1954 after winning the election as a write-in candidate—the only Senator to ever win by write-in vote. During most of his tenure, he served on the Armed Services Committee, becoming chairman in 1995. He retired from the Senate in January, after 48 years in office.

Shortly before he left office, the Air Force named a C-17 airlifter *Spirit of Strom Thurmond* to honor his many years of support for the armed forces.

Index to Advertisers

| | |
|------------------------------|--------------|
| Agusta Westland..... | 3 |
| AT&T..... | Cover III |
| Boeing..... | 25 |
| CMC Electronics..... | 43 |
| Erosonic..... | 6 |
| Lockheed Martin..... | Cover II, 49 |
| Motion Models..... | 5 |
| Northrop Grumman..... | 29, Cover IV |
| Pratt & Whitney..... | 9 |
| Raytheon..... | 31 |
| Rockwell Collins..... | 63 |
| SES Americam..... | 37 |
| <hr/> | |
| AFA National Convention..... | 87 |
| AFA Membership..... | 15 |
| AFA Wearables..... | 94 |



The Miniature Air-Launched Decoy (shown here in an artist's concept) would be used to saturate enemy air defense systems by appearing on radar screens as a full-size bomber or fighter. The decoy will be launched by fighters or bombers. (See "Mini-Decoy Development Begins," below right.)

Robert Stump, 1927-2003

Robert L. Stump, who served in the House of Representatives for 26 years, died June 20 in Phoenix of a blood disorder. He was 76.

Stump, who was born April 2, 1927, in Phoenix, retired from Congress in January. He had been chairman of both the Veterans' Affairs Committee and Armed Services Committee.

He served as a combat medic in the Navy during World War II. In 1951, he graduated from Arizona State University with a degree in agronomy. Stump was elected to the Arizona state House of Representatives in 1959, where he remained until 1967, when he was elected a state senator. He was elected to Congress in 1976.

Stump routinely supported spending increases for military forces and veterans. During three terms as Veterans' Affairs chairman, he pushed for improved health benefits.

Senior Staff Changes

PROMOTIONS: To Lieutenant General: Michael M. Dunn, John W. Rosa Jr., Randall M. Schmidt. To ANG Major General: Douglas Burnett, John B. Handy, Marvin S. Mayes, Douglas R. Moore, Richard L. Testa. To ANG Brigadier General: Joseph G. Balskus, Bobby L. Brittain, Thomas J. Deardorff, Thomas F. Deppe, William J. Germann, Michael P. Hickey, Charles V. Ickes II, William E. Jernigan, Henry C. Morrow, Donald J. Quenneville, Daniel R. Scace, Timothy W. Scott, Eugene A. Sevi, Darryll D.M. Wong. To AFRC Brigadier General: Craig S. Ferguson.

CHANGES: Brig. Gen. Curtis M. Bedke, from IG, ACC, Langley AFB, Va., to Dep. Chief, Central Security Service, NSA, Ft. Meade, Md. ... Lt. Gen. Walter E.L. Buchanan III, from Vice Cmdr., 9th Air Exped. Task Force, CENTCOM, to Cmdr., 9th Air Force, Shaw AFB, S.C. ... Brig. Gen. (sel.) Jack B. Egginton, from Exec. to C/S, USAF, Pentagon, to Cmdr., 379th AEW, ACC, Al Udeid AB, Qatar ... Brig. Gen. Stephen M. Goldfein, from Dep. Dir., Jt. Warfighting Capability Assessments, JCS, Pentagon, to Dir., Operational Capability Rqmts., DCS, Air & Space Cps., USAF Pentagon ... Maj. Gen. Jonathan S. Gratton, from Dir., Regional Affairs, Dep. Under SECAF, Intl. Affairs, Pentagon, to Asst. Dep. Under SECAF, Intl. Affairs, Pentagon ... Lt. Gen. William T. Hobbins, from Cmdr., 12th AF, ACC, Davis-Monthan AFB, Ariz., to DCS, Warfighting Integration, USAF, Pentagon ... Brig. Gen. (sel.) Kay C. McClain, from Cmdr., Air Reserve Personnel Ctr., AFRC, Denver, to Dep. Dir., Ops., AETC, Randolph AFB, Tex. ... Maj. Gen. (sel.) Teresa M. Peterson, from Cmdr., 305th AMW, AMC, McGuire AFB, N.C., to Dir., Ops. & Tng., DCS, Air & Space Ops., USAF, Pentagon ... Lt. Gen. Randall M. Schmidt, from Asst. DCS, Air & Space Cps., USAF, Pentagon, to Cmdr., 12th AF, ACC, Davis-Monthan AFB, Ariz. ... Maj. Gen. (sel.) Robin E. Scott, from Commanding Gen., Combined Task Force, Operation Northern Watch, EUJCOM, Incirlik AB, Turkey, to Dep. Dir., JWCA, JCS, Pentagon. ■

effect June 4, while the decreases and cuts were to begin July 4.

The cuts reflect increased retention rates in some career fields, according to Maj. Gen. Peter U. Sutton, USAF's director of learning and force development.

He said, too, that USAF will continue to shift the bonuses based on the needs of the service. The bonuses provide up to \$60,000 for enlisted members in certain skills.

Advancing GPS III To Cost More

Moving up the launch date from 2012 to 2010 for Global Positioning System III satellites would cost more than \$300 million in funding through 2009, OSD officials have determined.

Of that, \$45 million would be needed just for Fiscal 2004.

The "quick look" figures were developed in response to a question from Defense Secretary Donald H. Rumsfeld, according to *Inside the Air Force*. Rumsfeld had issued a "snowflake" memo in February to his staff asking why the GPS III would not launch in 2010.

Other higher priorities led the Pentagon to zero out the Fiscal 2004 funding for GPS III.

Defense authorization committees in the House and Senate restored \$45 million and \$80 million, respectively. Budget resolution of the program awaits markup by the House and Senate Appropriations Committees.

Mini-Decoy Development Begins

Officials at Eglin AFB, Fla., have begun development of an air-launched decoy that is designed to draw enemy fire. By doing so, it will disclose enemy air defense capabilities and help keep pilots out of harm's way. (See artist's concept at left.)

Officials awarded Raytheon \$88 million to develop the Miniature Air-Launched Decoy and deliver 1,500 units by 2011 at a maximum unit cost of \$125,000.

CAP Seeks Sponsors

Civil Air Patrol in June launched a Corporate Partner Program, a marketing arrangement with corporations to support CAP's activities in homeland security, the war on drugs, and youth development.

The program allows businesses of any size to use the CAP name and corporate partner mark in advertising, marketing, and promotions.

Retired USAF Col. Al Allenback, CAP executive director, noted that corporations supported CAP and other civil defense organizations in the 1940s and 1950s. ■

Action in Congress

By Tom Philpott, Contributing Editor

Concurrent Receipt Back in Play, CRSC Swamps Pentagon, Lawmakers Tackle Tax Inequity

Next on Concurrent Receipt?

Congress hasn't given up the idea of changing the status quo on concurrent receipt.

Current law bans receipt of full retired pay and disability pay. Almost 700,000 retirees are affected.

Late last year, Congress created the Combat Related Special Compensation program to help compensate for the offset in retired pay that occurs as retirees, typically with 20 or more years of service, become eligible for VA disability pay. The program began on June 1. (See "CRSC Deluge Hits Pentagon," below.)

However, some lawmakers continue to press to end the ban entirely, despite the fact that President Bush still threatens to veto any such measure passed by Congress.

The Senate in May voted again to include a "full concurrent receipt" provision in the Fiscal 2004 Department of Defense authorization. It would cost \$5 billion a year, by one estimate.

Since Senators set aside no funding, some view the action as political posturing.

Rep. Michael Bilirakis (R-Fla.), author of HR 303, the "Retired Pay Restoration Act of 2003," hopes to persuade House conferees to support the Senate provision, which would mean adopting his bill. HR 303 has 341 co-sponsors.

CRSC Deluge Hits Pentagon

Large numbers of military retirees with disabilities now are seeking Combat Related Special Compensation payments.

The military services in June were swamped by thousands of retiree applications, but they reviewed and approved only about 100—most of them from USAF retirees—in time for payment in July.

The government estimates that 35,000 to 45,000 retirees qualify for remuneration under CRSC. Monthly payments, of \$104 to \$2,193 a month, will be made, retroactive to June 1.

To be eligible for CRSC, a retiree

must have 20 years of service, a VA disability for which he or she received a Purple Heart, or disability ratings of 60 percent or higher due to combat or combat-related training.

Equity for Military Homeowners

Lawmakers still seem interested in moving this year to correct a tax inequity that hurts military and Foreign Service personnel who realize profits from the sale of a home.

Under federal law, individuals owe no taxes on the first \$250,000 in capital gains from a home sale. For married couples filing jointly, the exempt amount is \$500,000.

To qualify, however, the selling owner must actually reside in the home for at least two of five years preceding a sale. That requirement harms troops and Foreign Service Officers, many of whom spend consecutive tours of duty away from home.

The key provision of a new military "tax fairness" package would let troops and FSOs suspend running of the two- and five-year periods while they are away on official assignment.

The remedy, if passed, would retroactively apply to any home sales since May 1997, when Congress created the problem.

House and Senate members have punched the military tax measure back and forth. House Republicans in May pulled it from the \$350 billion tax bill President Bush signed. However, Rep. Bill Thomas (R-Calif.), chairman of the House Ways and Means Committee, attached military provisions to a catch-all bill—HR 1308, the All-American Tax Relief Act of 2003.

More Military Tax Relief?

Active duty homeowners are not the only uniformed members who would benefit from the All-American Tax Relief Act of 2003.

Reservists and Guardsmen stand to gain from a provision allowing deductions of up to \$1,500 a year for lodging and travel expenses when

servicing, and staying overnight, more than 100 miles from home.

These reserve expenses would become "above-the-line" deductions from gross income, which would reduce the tax bite for even those reservists who don't itemize deductions.

The tax bill also would make the \$6,000 death gratuity entirely tax free for military survivors. At present, only half is exempt from taxation.

USFSPA Reforms Sought

Military retirees are struggling to "rebalance" the Uniformed Services Former Spouses Protection Act, but with little visible progress so far.

In March, Rep. Cass Ballenger (R-N.C.) introduced the Uniformed Services Divorce Equity Act of 2003 to aid military members in disputes with ex-spouses about sharing retired pay.

Ballenger's bill would limit the ex-spouse payments to a period of time equal to the length of the marriage itself. The bill also would base any ex-spouse payment on a retired member's pay grade and service longevity at the time of divorce, not at retirement. The bill also would set a two-year deadline for ex-spouses to apply for division of retired pay.

The latter two provisions apply only to future divorces.

Tricare Standard Gets Attention

Congress has prodded defense health officials into taking several actions next year to help Tricare Standard users locate participating physicians and understand their benefits.

Advocates for almost two million beneficiaries who rely on the traditional fee-for-service insurance, once known as CHAMPUS, testified in March that Standard users are "neglected."

The House 2004 defense authorization bill directs DOD to create an "outreach" plan for the Tricare Standard beneficiaries to help them understand coverage, obtain provider information, and ease other

program challenges. The Senate version directs DOD to ensure "continued viability and adequacy" of Standard.

Edward P. Wyatt Jr., principal deputy assistant secretary of defense for health affairs, said DOD efforts include developing a list of physicians who accept Standard and doing more to educate beneficiaries and physicians. Defense health officials concede that in recent years they have focused on improving Tricare Prime, the military's managed care program, and starting Tricare for Life, an insurance supplement to Medicare for service elderly.

Beneficiary groups complain that a rising number of doctors won't accept Standard because reimbursements are too low or paperwork too burdensome.

Tricare Maternity Issue Resolved

DOD health officials say they won't fight Congress anymore on decisions regarding Tricare maternity practices.

Many expectant mothers want to arrange maternity care with a civilian doctor, using Tricare Standard. However, DOD has required pregnant beneficiaries living within 40 miles of a base to first get a non-availability statement from a base hospital.

Congress heard so many complaints that, in 2001, it voted to lift the NAS requirement for maternity care, effective December 2003. Expectant mothers who use Standard no longer will have to seek care first from the base hospital.

Pregnant beneficiaries have been a captive population for military obstetricians. Because of the NAS requirement, Standard patients could be pulled in for maternity care.

Military obstetricians worry about losing access to Standard patients. Also, they fear, many female patients with Tricare Prime coverage will opt out of military managed care once they become pregnant.

DOD officials asked Congress to delay lifting the NAS requirement for six months as the services scramble to expand maternity care services. The House and Senate ignored the requests.

Wyatt, DOD's No. 2 health affairs official, said: "We folded the tent."

Extra Pay for 109th Is Iced

The General Accounting Office advised Congress against changing the law to let air and maintenance

crews of the 109th Airlift Wing, New York Air National Guard, receive hardship duty pay.

The wing provides air logistics support for National Science Foundation activities in Antarctica and the Arctic region.

Unit officers proposed that crews for its 10 LC-130 ski-equipped aircraft draw hazardous duty pay for working in extreme polar weather conditions.

To qualify for such pay, however,

year, in-grade requirement that senior officers now must fulfill to retire at top rank.

Members of the Senate Armed Services Committee declined even to consider flag officer management "transformation." The House Armed Services Committee carried Rumsfeld's package only a little farther before chucking it altogether.

Full Funding for VA Accounts?

Rep. Chris Smith (R-N.J.), the



Rumsfeld's flag officer reforms got a cold reception.

members must spend 30 consecutive days in a hardship zone. The 109th crews typically do not stay long enough to qualify.

GAO claimed Congress did not intend for hazardous duty pay to be used in stays of short duration.

Rumsfeld Loses a Round

Secretary of Defense Donald H. Rumsfeld may covet greater authority over flag officer rotations, tour lengths, and age ceilings, but his legislative proposals have landed on Capitol Hill with a resounding thud.

A plan presented by Rumsfeld would allow selected senior officers—active and reserve—to serve up to 40 years and retire at 100 percent of basic pay. It would remove time-in-service ceilings on flag officers, raise age ceilings by several years, and allow the Secretary of Defense to grant even longer age deferments.

It would have relaxed the three-

chairman of the House Veterans' Affairs Committee, moved to carry out a key—and controversial—recommendation of a Presidential task force on veterans care.

The President's Task Force to Improve Health Care Delivery of our Nation's Veterans recommended giving VA enough money to fully fund care for enrolled veterans in Priority Groups 1 through 7. (See "Aerospace World: Veterans Task Force Issues Report, Sparks Fly," on p. 15.)

Smith in mid-June introduced the Veterans' Health Care Full Funding Act, HR 2475. It would create an independent panel of economists to set health care funding levels for the VA, based on needs of patients in Priority Groups 1 through 7.

HR 2475 would force VA to meet its own access standards. If a patient seeking non-emergency care can't be seen within 30 days, VA would have to contract for care with a non-VA provider. ■

AP photo/Terry Ashe

Verbatim

By John T. Correll, Contributing Editor

Terrorists? Where?

"Is there really an entity called al Qaeda? Was it in Afghanistan? Does it exist now?"—*Syrian President Bashar Assad, Kuwaiti newspaper Al Anba, quoted by Los Angeles Times, May 26.*

McPeak and Powell

"The country is much better off having him where he is—an honest, hardworking guy. I applaud him. ... He's a national resource, a treasure. He hasn't changed any since he was Chairman. I disagreed with him now and then, sometimes to the point of heated words. He might have been right on some of those issues."—*Retired Gen. Merrill A. McPeak, former Air Force Chief of Staff, about Secretary of State Colin Powell, former Chairman of the Joint Chiefs of Staff, speech in Bend, Ore., May 28.*

The Bastards in Washington

"I have my detractors in Washington. There are bastards who spread things around, of course, who planted nasty things in the media. Not that I cared very much."—*UN Chief Weapons Inspector Hans Blix, The Guardian (UK), June 11.*

France Chides Pentagon

"The American Defense Secretary believes the United States is the only military, economic, and financial power in the world. We do not share this vision."—*Michele Alliot-Marie, French defense minister, interview with Le Monde, reported by Reuters, June 14.*

New and Old Europeans

"The distinction between old and new in Europe today is really not a matter of age or size or geography. It's really a matter of attitude, of the vision that countries bring to the trans-Atlantic relationship. ... It should come as no surprise that many of the nations with fresh memories of tyranny and occupation have been among those most willing to face the new threats and contribute to dealing with them."—*Secretary of De-*

fense Donald H. Rumsfeld, speech at the Marshall Center, Garmisch-Partenkirchen, Germany, June 11.

Our Bon Amis

"For years, many governments played down the threats of Islamic revolution, turned a blind eye to international terrorism, and accepted the development of weaponry of mass destruction by dictators. Indeed, some politicians were happy to go further, collaborating with the self-proclaimed enemies of the West for their own short-term gain—but enough about the French."—*Lady Margaret Thatcher, former British Prime Minister, speech to Atlantic Bridge, New York, May 14.*

Threat Not Yet

There is a significant group of people out there who say that China is going to be a military superpower and it will be an adversary to the United States. And it may well turn out that way but not in the near future."—*Harold Brown, former Secretary of Defense and participant in Council on Foreign Relations study that says China's military is at least two decades away from military challenge to US, New York Times, May 23.*

Glad He's Gone

"The [European Union] may have been divided about the means of Iraqi disarmament, but no one contested the objective of disarmament. Europeans had no doubt that Iraq under Saddam was a brutal and murderous regime."—*Guenter Burghardt, European Union ambassador to US, speech at San Diego University, San Diego Union-Tribune, May 23.*

Hartless

"The war on terrorism is fundamentally altering our global policies. We have discarded our half-century reliance on the Atlantic alliance for collective security. We have marginalized the United Nations at the precise time it should have been empowered to undertake peacemaking

roles. And we have alienated key regional powers, including Russia, China, and India, at a time when we should be encouraging them to assume greater responsibilities for regional stability."—*Gary Hart, former US senator and recent Presidential candidate, signed op-ed, Boston Globe, June 2.*

Stretching the Facts

"There is no question in my mind (policy-makers) distorted the situation, either because they had bad intelligence or because they misinterpreted it."—*Stansfield Turner, CIA director in the Carter Administration, on assessment of weapons of mass destruction in Iraq, USA Today, June 18.*

You're Outta Here

"Many poor performers are also just bad employees in general, so you're lucky if a poor performer comes into work and punches you out. That way you can just fire him."—*Bill Wiley, former Merit Systems Protection Board employee, on the difficulty of firing civil servants, Federal Times, June 9.*

Eager To Learn

"The first time I met Bush 43 I knew he was different. Two things became clear. One, he didn't know very much. The other was he had the confidence to ask questions that revealed he didn't know very much. Most people are reluctant to say when they don't know something, a word or a term they haven't heard before. Not him. You'd raise a point, and he'd say, 'I didn't realize that. Can you explain that?' He was eager to learn."—*Richard Perle, former chairman of the Defense Policy Board, on George W. Bush at the beginning of the 2000 election campaign, Vanity Fair, July.*

Pluperfect Standard

"If you're going to have a doctrine of pre-emption, then you sure as heck better have pluperfect intelligence."—*Sen. John D. Rockefeller IV, (D-W.Va.), USA Today, June 6.*

2003



Space Almanac

0

In the following pages appears a variety of information and statistical material about space—particularly military activity in space. This almanac was compiled by *Air Force Magazine*, with assistance and information from Steve Garber, NASA History Office; Phillip S. Clark, Molniya Space Consultancy; Joseph J. Burger, Space Analysis and Research, Inc.; and US Strategic Command and Air Force Space Command Public Affairs Offices.

Figures that appear in this section will not always agree because of different cutoff dates, rounding, or different methods of reporting. The information is intended to illustrate trends in space activity.

By Tamar A. Mehuron, Associate Editor

MSgt. Bruno Trepanier from the 354th Communications Squadron, Eielson AFB, Alaska, works in support of Exercise Keen Sword 03 at Kasuga AB, Japan. The squadron's job while deployed is to establish a satellite link to provide Internet and e-mail access and both secure and commercial lines.

Introduction



What's Up There

As of May 31, 2003

| Country/Organization | Satellites | Space Probes | Debris | Total |
|----------------------------|--------------|--------------|--------------|--------------|
| CIS (Russia/former USSR) | 1,338 | 35 | 2,550 | 3,923 |
| US | 889 | 49 | 2,842 | 3,780 |
| European Space Agency | 33 | 2 | 305 | 340 |
| People's Republic of China | 36 | 0 | 282 | 318 |
| India | 25 | 0 | 124 | 149 |
| Japan | 80 | 6 | 56 | 142 |
| Intl. Telecom Sat. Org. | 60 | 0 | 0 | 60 |
| Globalstar | 52 | 0 | 0 | 52 |
| France | 33 | 0 | 15 | 48 |
| Orbcomm | 35 | 0 | 0 | 35 |
| European Telecom Sat. Org. | 24 | 0 | 0 | 24 |
| Germany | 19 | 2 | 1 | 22 |
| United Kingdom | 21 | 0 | 1 | 22 |
| Canada | 20 | 0 | 1 | 21 |
| Italy | 11 | 0 | 3 | 14 |
| Luxembourg | 13 | 0 | 0 | 13 |
| Australia | 8 | 0 | 2 | 10 |
| Brazil | 10 | 0 | 0 | 10 |
| Sweden | 10 | 0 | 0 | 10 |
| Indonesia | 9 | 0 | 0 | 9 |
| Intl. Maritime Sat. Org. | 9 | 0 | 0 | 9 |
| NATO | 8 | 0 | 0 | 8 |
| Arab Sat. Comm. Org. | 7 | 0 | 0 | 7 |
| Argentina | 7 | 0 | 0 | 7 |
| Sea Launch | 1 | 0 | 6 | 7 |
| South Korea | 7 | 0 | 0 | 7 |
| Mexico | 6 | 0 | 0 | 6 |
| Spain | 6 | 0 | 0 | 6 |
| Netherlands | 5 | 0 | 0 | 5 |
| AsiaSat Corp. | 4 | 0 | 0 | 4 |
| Czech Republic | 4 | 0 | 0 | 4 |
| Intl. Space Station | 1 | 3 | 0 | 4 |
| Israel | 4 | 0 | 0 | 4 |
| Thailand | 4 | 0 | 0 | 4 |
| Turkey | 4 | 0 | 0 | 4 |
| Malaysia | 3 | 0 | 0 | 3 |
| Norway | 3 | 0 | 0 | 3 |
| Saudi Arabia | 3 | 0 | 0 | 3 |
| Egypt | 2 | 0 | 0 | 2 |
| France/Germany | 2 | 0 | 0 | 2 |
| Philippines | 2 | 0 | 0 | 2 |
| Algeria | 1 | 0 | 0 | 1 |
| Chile | 1 | 0 | 0 | 1 |
| China/Brazil | 1 | 0 | 0 | 1 |
| Denmark | 1 | 0 | 0 | 1 |
| EUME | 1 | 0 | 0 | 1 |
| Greece | 1 | 0 | 0 | 1 |
| NICO | 1 | 0 | 0 | 1 |
| Pakistan | 1 | 0 | 0 | 1 |
| Portugal | 1 | 0 | 0 | 1 |
| Republic of China (Ta wan) | 1 | 0 | 0 | 1 |
| Saudi Arabia/France | 1 | 0 | 0 | 1 |
| Singapore/Taiwan | 1 | 0 | 0 | 1 |
| JAE | 1 | 0 | 0 | 1 |
| Total | 2,831 | 97 | 6,188 | 9,116 |

WHAT IF A SINGLE WARFIGHTER SHARED THE KNOWLEDGE OF MILLIONS?

The U.S. military and Boeing Integrated Defense Systems are making this happen. Creating a global integrated battlespace network to give U.S. forces and allies the right information at the right time, so they can act before the enemy can think. From world-class fighters, airlifters, tankers and intelligence systems to next-generation communication satellites, launch systems and unmanned combat aerial vehicles,

Boeing brings the best of industry, people and technology to the task.

So no warfighter is ever alone.

Worldwide Orbital Launch Sites, 1957-2002

| Launch Site | Owner | Total Launches |
|-------------------------------|-------------|----------------|
| Plesetsk | Russia | 1,535 |
| Tyuratam/Baikonur, Kazakhstan | Russia | 1,190 |
| Vandenberg AFB, Calif. | US | 620 |
| Cape Canaveral AFS, Fla. | US | 583 |
| Kourou, French Guiana | ESA | 166 |
| JFK Space Center, Fla. | US | 133 |
| Kapustin Yar | Russia | 101 |
| Tanegashima | Japan | 35 |
| Xichang | China | 33 |
| Kagoshima | Japan | 30 |
| Shuang Cheng-tsu/Jiuquan | China | 30 |
| Wallops Flight Facility, Va. | US | 30 |
| Edwards AFB, Calif. | US | 20 |
| Sriharikota | India | 16 |
| Taiyuan | China | 16 |
| Indian Ocean Platform | US | 9 |
| Pacific Ocean Platform | Sea Launch | 8 |
| Palmachim | Israel | 5 |
| Hammaguir, Algeria | France | 4 |
| Svobodny | Russia | 4 |
| Woomera, Australia | Australia | 4 |
| Alcantara | Brazil | 2 |
| Barents Sea | Russia | 1 |
| Gando AB, Canary Islands | Spain | 1 |
| Kodiak, Alaska | US | 1 |
| Kwajalein, Marshall Islands | US | 1 |
| Musudan ri | North Korea | 1 |
| Total | | 4,579 |

Space on the Web

(Some of the space-related sites on the World Wide Web)

Defense

| | Web address |
|------------------------------|--|
| US Strategic Command | www.stratcom.mil |
| Air Force Space Command | www.peterson.af.mil/hqafspc |
| 21st Space Wing | www.peterson.af.mil/21sw |
| 30th Space Wing | www.vandenberg.af.mil |
| 45th Space Wing | https://www.patrick.af.mil |
| 50th Space Wing | www.schriever.af.mil |
| Space & Missile Systems Ctr. | www.losangeles.af.mil |

Industry

| | |
|-----------------------------------|--|
| Boeing Integrated Defense Systems | www.boeing.com/ids |
| Lockheed Martin Astronautics | www.ast.lmco.com |
| Northrop Grumman Space Technology | www.st.northropgrumman.com |
| Orbital Sciences | www.orbital.com |
| Spectrum Astro | www.spectrumastro.com |

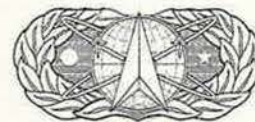
NASA

| | |
|---------------------------------------|--|
| Integrated Launch Schedule | www-pao.ksc.nasa.gov/kscpao/schedule/mixfleet.htm |
| Jet Propulsion Laboratory | www.jpl.nasa.gov |
| NASA Human Spaceflight Science @ NASA | spaceflight.nasa.gov/science.nasa.gov |
| Space Center Houston | spacecenter.org |

Other

| | |
|------------------|--|
| Florida Today | www.flatoday.com/space |
| Space.com, Inc. | www.space.com |
| Spaceweather.com | www.spaceweather.com |

Space and Missile Badges

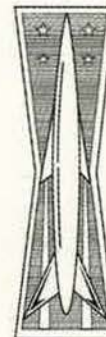


Space/Missile Badge



Astronaut Pilot*

*The astronaut designator indicates a USAF rated officer qualified to perform duties in space (50 miles and up) and who has completed at least one operational mission. Pilot wings are used here only to illustrate the position of the designator on the wings.



Missile Badge



Missile Badge with Operations Designator

The Year in Space



Aug. 21, 2002

Lockheed Martin launches its first Atlas V, the first of two new launch vehicles developed under USAF's evolved expendable launch vehicle (EELV) program. The Atlas V boosts a Eutelsat Hot Bird 6 communications satellite into orbit from Cape Canaveral AFS, Fla.

Aug. 28

Government officials in Florida, including representatives of the 45th Space Wing, Patrick Air Force Base, unveil a 50-year vision, titled the Cape Canaveral Spaceport Master Plan. Among its initiatives, the plan envisions a possible 10-fold increase in launches, collocating administrative offices of the Cape and Kennedy Space Center in one area, placing launch facilities in a consolidated area, and creating an enlarged visitor complex to include hotels and conference centers.

Oct. 1

US Space Command stands down and its mission shifts to US Strategic Command, headquartered at Offutt AFB, Neb. The new STRATCOM retains primary responsibility for US nuclear forces and gains the responsibility to define, plan, develop, and conduct space operations.

Oct. 10

Ukrainian officials announce they intend to sell Soviet-made RS-18 ICBMs—known in NATO as SS-19s—to Russia to use to launch satellites.

Oct. 14

A prototype interceptor intercepts a Minuteman ICBM modified as a target during a flight test for the Ground-based Midcourse Defense development program. The target was launched from Vandenberg AFB, Calif., and the interceptor was launched from the Ronald Reagan Missile Site, Kwajalein Atoll, in the Marshall Islands. The test marks the fifth successful intercept and fourth consecutive intercept in seven flight tests since October 1999.

Nov. 20

Boeing's Delta IV, the second of the new EELVs partially funded by USAF, marks its debut by boosting a Eutelsat payload from Cape Canaveral.

Dec. 17

President Bush announces plans to field an initial missile defense capability for the US by 2004-05. The capability is to include ground- and sea-based interceptors, additional Patriot units, and sensors based on land, at sea, and in space.

Jan. 5, 2003

China's unmaned Shenzhou IV lands after a week in orbit to test life-support systems. It carries all the equipment needed for a manned flight, the first of which China intends to conduct later this year.

Jan. 6

A Titan II launches from Vandenberg a joint Air Force and Navy research satellite, Coriolis, that carries two scientific instru-

ments to aid military operations. The Air Force Research Lab's Solar Mass Ejection Imager is designed to monitor the Sun's coronal eruptions, which can disrupt satellite operations, along with communication services and electrical power grids on Earth. The Naval Research Lab's Windsat measures wind speed and direction at sea level to help the Navy plan more effective deployment of ships and weapons systems.

Jan. 8

South Korea announces it will launch in 2005 its first satellite designed specifically for military use. The Koreasat-5 is South Korea's fourth satellite.

Jan. 29

USAF boosts into orbit the 27th operational Global Positioning System satellite aboard a Delta II from Cape Canaveral. The satellite replaces a GPS launched 10 years ago. The launch vehicle displays USAF's nose art "Let's Roll," a phrase uttered by Todd Beamer, who, with other passengers, attacked 9/11 terrorists aboard United Flight 93 before the airliner crashed in rural Pennsylvania.

Feb. 1

Two Air Force officers—Col. Rick D. Husband and Lt. Col. Michael P. Anderson—were among the seven-member crew killed when the shuttle *Columbia* broke apart over north central Texas. Husband was the mission commander and Anderson the payload commander.

Feb. 6

Vandenberg launches the first Taurus Lite, an Orbital Sciences booster developed as the interceptor prototype for the Missile Defense Agency's Ground-based Midcourse Defense program. The booster is a Taurus-Pegasus-Minotaur derivative and launches from a concrete pad rather than a silo.

March 10

USAF launches a DSCS satellite—the first military payload using an EELV—via a Boeing Delta IV booster from Cape Canaveral.

March 12

Peter B. Teets, undersecretary of the Air Force, and Gen. Lance W. Lord, commander of Air Force Space Command, tell lawmakers that developing a cadre of space professionals—military and civilian—is one of USAF's top priorities for national security space in 2004. This was one of 10 recommendations from the Commission to Assess US National Security Space Management and Organization, headed by Donald H. Rumsfeld before he became Secretary of Defense.

March 20 (Baghdad time)

Two USAF F-117 stealth fighters employ GPS-guided EGBU-27 bombs against a key Iraqi command bunker in Baghdad in the opening stages of Operation Iraqi Freedom.

March 25

US officials announce that coalition forces destroyed six devices being used by the Iraqis to try to jam signals from the GPS satellite system. In one instance, the US uses a GPS-guided bomb to destroy the GPS jamming device.

March 27

Japan launches its first two spy satellites into orbit from Tanegashima Space Center. Once complete, a four-satellite constellation will enable Japan to monitor North Korea's long-range missile development and suspected nuclear weapons program.

March 31

USAF boosts the ninth GPS IIR into orbit on a Delta II from Cape Canaveral.

April 8

A Titan IVB launching from Cape Canaveral sends into orbit the last Milstar military communications satellite needed to complete the constellation.

April 22

Air Force Space Command's 14th Air Force activates first-of-its-kind space intelligence squadron. The mission of the 614th SIS is to identify and devise means to respond to threats to US space systems.

April 24

Russia places into orbit a classified military satellite aboard a heavy-weight Proton-K rocket, launched from the Baikonur Cosmodrome in Kazakhstan.

May 13

In a shift in policy, President Bush issues the US Commercial Remote Sensing Space Policy, which calls on federal agencies to rely "to the maximum practical extent" on commercial space imagery to fill imagery and geospatial needs for military, intelligence, foreign policy, homeland security, and civil users. The new policy is designed to help maintain a robust commercial remote sensing capability to "augment and potentially replace" some existing government capabilities.

May 25

China launches a third navigation satellite on a Long March 3-A rocket to complete its Beidou satellite system, a navigation aid for transportation, meteorology, petroleum production, telecommunications, and public security.

May 26

Galileo, the European alternative to the US Global Positioning System, wins approval from the 15 nations of the European Space Agency. Plans call for it to consist of a network of 30 satellites that would offer free navigation service to the public just as GPS does but would charge commercial customers to receive a more-precise navigation capability.

June 4

Russia boosts a classified military satellite into orbit from Plesetsk Cosmodrome aboard a Kosmos-3M rocket.

Military & Civilian Space Budgets

US Space Funding, Current Dollars

(Millions, as of Sept. 30, 2002)

| FY | NASA | DOD | Other | Total |
|--------------|------------------|------------------|-----------------|------------------|
| 1959 | \$261 | \$490 | \$34 | \$785 |
| 1960 | 462 | 561 | 43 | 1,066 |
| 1961 | 926 | 814 | 68 | 1,808 |
| 1962 | 1,797 | 1,298 | 199 | 3,294 |
| 1963 | 3,626 | 1,550 | 257 | 5,433 |
| 1964 | 5,016 | 1,599 | 213 | 6,828 |
| 1965 | 5,138 | 1,574 | 241 | 6,953 |
| 1966 | 5,065 | 1,689 | 214 | 6,968 |
| 1967 | 4,830 | 1,664 | 213 | 6,707 |
| 1968 | 4,430 | 1,922 | 174 | 6,526 |
| 1969 | 3,822 | 2,013 | 170 | 6,005 |
| 1970 | 3,547 | 1,678 | 141 | 5,366 |
| 1971 | 3,101 | 1,512 | 162 | 4,775 |
| 1972 | 3,071 | 1,407 | 133 | 4,611 |
| 1973 | 3,093 | 1,623 | 147 | 4,863 |
| 1974 | 2,759 | 1,766 | 158 | 4,683 |
| 1975 | 2,915 | 1,892 | 158 | 4,965 |
| 1976 | 4,074 | 2,443 | 211 | 6,728 |
| 1977 | 3,440 | 2,412 | 194 | 6,046 |
| 1978 | 3,623 | 2,738 | 226 | 6,587 |
| 1979 | 4,030 | 3,036 | 248 | 7,314 |
| 1980 | 4,680 | 3,848 | 231 | 8,759 |
| 1981 | 4,992 | 4,828 | 234 | 10,054 |
| 1982 | 5,528 | 6,679 | 313 | 12,520 |
| 1983 | 6,328 | 9,019 | 327 | 15,674 |
| 1984 | 6,858 | 10,195 | 395 | 17,448 |
| 1985 | 6,925 | 12,768 | 584 | 20,277 |
| 1986 | 7,165 | 14,126 | 477 | 21,768 |
| 1987 | 9,809 | 16,287 | 466 | 26,562 |
| 1988 | 8,322 | 17,679 | 741 | 26,742 |
| 1989 | 10,097 | 17,906 | 560 | 28,563 |
| 1990 | 11,460 | 15,616 | 506 | 27,582 |
| 1991 | 13,046 | 14,181 | 772 | 27,999 |
| 1992 | 13,199 | 15,023 | 798 | 29,020 |
| 1993 | 13,064 | 14,106 | 731 | 27,901 |
| 1994 | 13,022 | 13,166 | 632 | 26,820 |
| 1995 | 12,543 | 10,644 | 759 | 23,946 |
| 1996 | 12,569 | 11,514 | 828 | 24,911 |
| 1997 | 12,457 | 11,727 | 739 | 24,973 |
| 1998 | 12,321 | 12,359 | 839 | 25,519 |
| 1999 | 12,459 | 13,203 | 932 | 26,644 |
| 2000 | 12,521 | 12,941 | 1,056 | 26,518 |
| 2001 | 13,304 | 14,326 | 1,073 | 28,703 |
| 2002 | 13,871 | 15,740 | 1,130 | 30,791 |
| Total | \$305,566 | \$323,562 | \$18,877 | \$648,005 |

US Space Funding, Constant Dollars

(Millions, as of Sept. 30, 2002)

| FY | NASA | DOD | Other | Total |
|--------------|------------------|------------------|-----------------|--------------------|
| 1959 | \$1,326 | \$2,490 | \$173 | \$3,990 |
| 1960 | 2,310 | 2,306 | 215 | 5,331 |
| 1961 | 4,579 | 4,025 | 336 | 8,939 |
| 1962 | 8,762 | 6,329 | 970 | 16,062 |
| 1963 | 17,486 | 7,475 | 1,239 | 26,200 |
| 1964 | 23,873 | 7,510 | 1,014 | 32,497 |
| 1965 | 24,170 | 7,404 | 1,134 | 32,708 |
| 1966 | 23,413 | 7,308 | 989 | 32,210 |
| 1967 | 21,856 | 7,530 | 964 | 30,349 |
| 1968 | 19,427 | 8,429 | 764 | 28,620 |
| 1969 | 16,177 | 8,520 | 721 | 25,418 |
| 1970 | 14,363 | 6,795 | 571 | 21,728 |
| 1971 | 11,904 | 5,804 | 622 | 18,330 |
| 1972 | 11,226 | 5,143 | 488 | 16,857 |
| 1973 | 10,801 | 5,668 | 515 | 16,983 |
| 1974 | 9,225 | 5,905 | 528 | 15,658 |
| 1975 | 9,099 | 5,905 | 492 | 15,496 |
| 1976 | 11,522 | 6,910 | 598 | 19,030 |
| 1977 | 8,809 | 6,177 | 496 | 15,481 |
| 1978 | 8,902 | 6,728 | 555 | 16,186 |
| 1979 | 9,267 | 6,982 | 570 | 16,819 |
| 1980 | 9,954 | 8,185 | 492 | 18,631 |
| 1981 | 9,751 | 9,431 | 458 | 19,640 |
| 1982 | 9,844 | 11,893 | 557 | 22,294 |
| 1983 | 10,531 | 15,009 | 544 | 26,084 |
| 1984 | 10,932 | 16,252 | 629 | 27,813 |
| 1985 | 10,646 | 19,629 | 897 | 31,173 |
| 1986 | 10,663 | 21,023 | 709 | 32,395 |
| 1987 | 14,255 | 23,669 | 677 | 38,600 |
| 1988 | 11,770 | 25,004 | 1,048 | 37,822 |
| 1989 | 13,828 | 24,523 | 767 | 39,118 |
| 1990 | 15,114 | 20,595 | 667 | 36,375 |
| 1991 | 16,582 | 18,024 | 981 | 35,587 |
| 1992 | 16,147 | 18,379 | 976 | 35,502 |
| 1993 | 15,575 | 16,817 | 871 | 33,263 |
| 1994 | 15,163 | 15,330 | 736 | 31,229 |
| 1995 | 14,296 | 12,131 | 865 | 27,292 |
| 1996 | 14,022 | 12,845 | 923 | 27,790 |
| 1997 | 13,624 | 12,826 | 863 | 27,313 |
| 1998 | 13,218 | 13,258 | 901 | 27,377 |
| 1999 | 13,180 | 13,967 | 1,039 | 28,185 |
| 2000 | 13,074 | 13,513 | 1,102 | 27,690 |
| 2001 | 13,611 | 14,657 | 1,098 | 29,366 |
| 2002 | 13,871 | 15,740 | 1,180 | 30,791 |
| Total | \$568,148 | \$505,139 | \$32,935 | \$1,106,223 |

Figures may not sum due to rounding. NASA totals represent space activities only. "Other" category includes the Departments of Energy, Commerce, Agriculture, Interior, and Transportation; the National Science Foundation; and the Environmental Protection Agency (only through 1998).

EVIDENCE OF A POWERFUL NEW FORCE.

It's been gathering momentum for years. Now, its strength is extraordinary. Northrop Grumman is a space powerhouse whose capabilities extend from the surface of the Earth to 14 billion light years in the past. Building upon a legacy of innovation, Northrop Grumman is prepared for virtually any mission related to space. And we are applying our systems, spacecraft, sensor, data distribution and integration expertise to transform complex ideas into tomorrow's reliable systems. From the Space Tracking and Surveillance System to the Orbital Space Plane, from the National Polar-orbiting Operational Environmental Satellite System to the James Webb Space Telescope, our potential is matched only by the vastness of space itself.

People & Organizations



Space Leaders

(As of July 1, 2003)

US Strategic Command

Adm. James O. Ellis Jr. Oct. 1, 2002-

US Space Command*

Gen. Robert T. Herres Sept. 23, 1985-Feb. 5, 1987
 Gen. John L. Piotrowski Feb. 6, 1987-March 30, 1990
 Gen. Donald J. Kutyna April 1, 1990-June 30, 1992
 Gen. Charles A. Horner June 30, 1992-Sept. 12, 1994
 Gen. Joseph W. Ashy Sept. 13, 1994-Aug. 26, 1996
 Gen. Howell M. Estes III Aug. 27, 1996-Aug. 13, 1998
 Gen. Richard B. Myers Aug. 14, 1998-Feb. 22, 2000
 Gen. Ralph E. Eberhart Feb. 22, 2000-Oct. 1, 2002

*US Space Command was inactivated Oct. 1, 2002, and its mission transferred to US Strategic Command.

Air Force Space Command

Gen. James V. Hartinger Sept. 1, 1982-July 30, 1984
 Gen. Robert T. Herres July 30, 1984-Oct. 1, 1986
 Maj. Gen. Maurice C. Padden Oct. 1, 1986-Oct. 29, 1987
 Lt. Gen. Donald J. Kutyna Oct. 29, 1987-March 29, 1990
 Lt. Gen. Thomas S. Moorman Jr. March 29, 1990-March 23, 1992
 Gen. Donald J. Kutyna March 23, 1992-June 30, 1992
 Gen. Charles A. Horner June 30, 1992-Sept. 13, 1994
 Gen. Joseph W. Ashy Sept. 13, 1994-Aug. 26, 1996
 Gen. Howell M. Estes III Aug. 26, 1996-Aug. 14, 1998
 Gen. Richard B. Myers Aug. 14, 1998-Feb. 22, 2000
 Gen. Ralph E. Eberhart Feb. 22, 2000-April 19, 2002
 Gen. Lance W. Lord April 19, 2002-

Army Space & Missile Defense Command*

Lt. Gen. John F. Wall July 1, 1985-May 24, 1988
 Brig. Gen. Robert L. Stewart May 24, 1988-July 11, 1988 (acting)
 Lt. Gen. Robert D. Hammond July 11, 1988-June 30, 1992
 Brig. Gen. William J. Schumacher (acting) June 30, 1992-July 31, 1992
 Lt. Gen. Donald M. Lionetti Aug. 24, 1992-Sept. 6, 1994
 Lt. Gen. Jay M. Garner Sept. 6, 1994-Oct. 7, 1996
 Lt. Gen. Edward G. Anderson III Oct. 7, 1996-Aug. 6, 1998
 Col. Stephen W. Flohr (acting) Aug. 6, 1998-Oct. 1, 1998
 Lt. Gen. John Costello Oct. 1, 1998-March 28, 2001
 Brig. Gen. John M. Urias (acting) March 28, 2001-April 30, 2001
 Lt. Gen. Joseph M. Ccsumano Jr. April 30, 2001-

*Army Space and Missile Defense Command was the Army Strategic Defense Command until August 1992 and the Army Space and Strategic Defense Command until October 1997.

National Reconnaissance Office

Joseph V. Charyk Sept. 6, 1961-March 1, 1963
 Erockway McMillan March 1, 1963-Oct. 1, 1965
 Alexander H. Flax Oct. 1, 1965-March 11, 1969
 John L. McLucas March 17, 1969-Dec. 20, 1973
 James W. Plummer Dec. 21, 1973-June 28, 1976
 Thomas C. Reed Aug. 9, 1976-April 7, 1977
 Hans Mark Aug. 3, 1977-Oct. 8, 1979
 Robert J. Hermann Oct. 8, 1979-Aug. 2, 1981
 Edward C. Aldridge Jr. Aug. 3, 1981-Dec. 16, 1988
 Martin C. Faga Sept. 26, 1989-March 5, 1993
 Jeffrey K. Harris May 19, 1994-Feb. 26, 1996
 Keith R. Hall (acting) Feb. 27, 1996-March 27, 1997
 Keith R. Hall March 28, 1997-Dec. 13, 2001
 Peter B. Teets Dec. 13, 2001-

Naval Network & Space Operations Command

RAAdm. John P. Cryer July 12, 2002-

Naval Space Command*

RAAdm. Richard H. Truly Oct. 1, 1983-Feb. 28, 1986
 Col. Richard L. Phillips, USMC March 1, 1986-April 30, 1986 (acting)
 RAAdm. D. Bruce Cargill April 30, 1986-Oct. 24, 1986
 RAAdm. Richard C. Macke Oct. 24, 1986-March 21, 1988
 RAAdm. David E. Frost March 21, 1988-April 2, 1990
 Col. Charles R. Geiger, USMC April 2, 1990-May 31, 1990 (acting)
 RAAdm. L.E. Allen Jr. May 31, 1990-Aug. 12, 1991
 RAAdm. Herbert A. Browne Jr. Aug. 12, 1991-Oct. 28, 1993
 RAAdm. Leonard N. Oden Oct. 28, 1993-Jan. 31, 1994
 RAAdm. Lyle G. Bien Jan. 31, 1994-Dec. 13, 1994
 RAAdm. Phillip S. Anselmo Dec. 13, 1994-April 18, 1995
 RAAdm. Katharine L. Laughton April 18, 1995-Feb. 28, 1997
 RAAdm. Patrick D. Moneyemaker Feb. 28, 1997-Sept. 10, 1998
 Col. Michael M. Henderson, USMC Sept. 10, 1998-Oct. 1, 1998 (acting)
 RAAdm. Thomas E. Zelibor Oct. 1, 1998-June 8, 2000
 RAAdm. J.J. Quinn June 8, 2000-March 31, 2001
 RAAdm. Richard J. Mauldin March 31, 2001-Dec. 10, 2001
 RAAdm. John P. Cryer Dec. 10, 2001-July 12, 2002

*Naval Space Command and Naval Network Operations Command merged July 12, 2002.



ISR

Space reveals the big picture

Space-based ISR is not just about the platform. It's about developing and integrating technologies that deliver total mission solutions. Software that manages and controls satellites. Advanced space sensors and radar imagery that reveal what you need to know. Ground-based networks and processing that transform data into knowledge and intelligence. We deliver decision-quality information so you can operate with confidence anywhere on Earth. Get the big picture with Raytheon – the eyes, ears and brains of ISR.

www.raytheon.com

Raytheon

Customer Success Is Our Mission

USECAF/DNRO Organization

(As of July 1, 2003)

Undersecretary of the Air Force and
Director, National Reconnaissance Office

Peter B. Teets

Deputy for Military Space
Robert S. Dickman

Deputy Director of NRO
Dennis D. Fitzgerald

Director of Space Acquisition
Maj. Gen. Joseph B. Sovey

Program Executive Officer for Air Force Space
Lt. Gen. Brian A. Arnold

Director of Space Operations & Integration
Maj. Gen. Franklin J. Blaisdell

Director of National Security Space
Maj. Gen. (sel.) C. Robert Kehler

Director, National Security Space Architect
Brig. Gen. Richard V. Geraci, USA

Air Force Space Command, Peterson AFB, Colo.

(As of July 1, 2003)

Commander
Gen. Lance W. Lord

Space and Missile Systems Center
Hq., Los Angeles AFB, Calif.
Cmdr.: **Lt. Gen. Brian A. Arnold**

Defense Meteorological Satellite System Program Office
Evolved Expendable Launch Vehicle SPO
Launch Programs SPO
Milsatcom JPO
Navstar Global Positioning System JPO
Satellite and Launch Control SPO
Space Based Infrared Systems SPO
Space & Missile Test & Evaluation Directorate, Kirtland AFB,
N.M.

Space Warfare Center
Schriever AFB, Colo.
Cmdr.: **Brig. Gen. Daniel J. Darnell**

14th Air Force
Hq., Vandenberg AFB, Calif.
Cmdr.: **Maj. Gen. Michael A. Hamel**

21st Space Wing, Peterson AFB, Colo.
30th Space Wing, Vandenberg AFB, Calif.
45th Space Wing, Patrick AFB, Fla.
50th Space Wing, Schriever AFB, Colo.
460th Air Base Wing, Buckley AFB, Colo.

20th Air Force
Hq., F.E. Warren AFB, Wyo.
Cmdr.: **Brig. Gen. Frank G. Klotz**

90th Space Wing, F.E. Warren AFB, Wyo.
91st Space Wing, Minot AFB, N.D.
341st Space Wing, Malmstrom AFB, Mont.

Major Military Space Commands

| Unified Command | Personnel | FY04 Budget | Functions |
|---|-----------|-----------------|--|
| US Strategic Command Offutt AFB, Neb. | 2,783 | \$443 million | Establishes and provides full-spectrum global strike, coordinated space and information operations capabilities to meet both deterrent and decisive national security objectives. Provides operational space support and integrated missile defense. Provides global C4ISR, as well as specialized planning expertise to the joint warfighter. |
| Service Commands | | | |
| Air Force Space Command Peterson AFB, Colo. | 25,619 | \$8.0 billion | Operates military space systems, ground-based missile-warning radars and sensors, missile-warning satellites, national launch centers, and ranges; tracks space debris; operates and maintains the USAF ICBM force. |
| Naval Network & Space Operations Command Dahlgren, Va. | 5,594 | \$313.5 million | Operates and maintains the Navy's space and global telecommunications systems and services, directly supports warfighting operations and command and control of naval forces, and promotes innovative technological solutions to warfighting requirements. |
| Army Space & Missile Defense Command Colorado Springs, Colo. | 850 | \$59.0 million | Manages joint tactical use of DSCS; operates space support teams; operates Joint Tactical Ground Stations for missile early warning to deployed forces; acts as Army focal point for terminal missile defense system; manages Army astronaut program. |

National Imagery and Mapping Agency (NIMA)

Headquarters: Bethesda, Md.
Established: Oct. 1, 1996
Director: James R. Clapper Jr.

Mission, Purpose, Operations

Provide timely, relevant, and accurate geospatial intelligence to support national security objectives. This DOD-chartered combat support agency is also a member of the Intelligence Community.

Structure

Major facilities in Virginia, Maryland, Washington, D.C., and Missouri, with the National Geospatial Intelligence College located at Ft. Belvoir, Va. Also, customer support teams and technical representatives stationed around the world at major customer locations.

Personnel

Classified.

Central Intelligence Agency (CIA)

Headquarters: McLean, Va.
Established: 1947
Director: George J. Tenet

Mission, Purpose, Operations

The CIA's Directorate for Science and Technology includes the Office of Development and Engineering, which develops systems from requirements definition through design, testing, and evaluation to operations. Works with systems not available commercially. Disciplines include laser communications, digital imagery processing, real-time data collection and processing, electro-optics, advanced signal collection, artificial intelligence, advanced antenna design, mass data storage and retrieval, and large systems modeling and simulations. Work includes new concepts and systems upgrades.

Structure

Classified.

Personnel

Classified.

National Reconnaissance Office (NRO)

Headquarters: Chantilly, Va.
Established: September 1961
Director: Peter B. Teets

Mission, Purpose, Operations

Design, build, and operate reconnaissance satellites to support global information superiority for the US. It has operated hundreds of satellites since it was formed in 1960 and officially recognized in 1961. Responsible for innovative technology; systems engineering; development, acquisition, and operation of space reconnaissance systems; and related intelligence activities. Supports monitoring of arms control agreements, military operations and exercises, natural disasters, environmental issues, and worldwide events of interest to the US.

Structure

NRO is a DOD agency, funded through part of the National Foreign Intelligence Program, known as the National Reconnaissance Program. Both the Secretary of Defense and Director of Central Intelligence have approval of the program.

The NRO has four deputy directors for resources, oversight, and management; national support; military support; and systems engineering. Three offices and four directorates report up to the level of the director. Offices are management services and operations, human resources, and space launch. Directorates are signals intelligence systems acquisition and operations, communications systems acquisition and operations, imagery systems acquisition and operations, and advanced systems and technology.

Personnel

Staffed by CIA (41 percent), USAF (49 percent), Navy/Marines (nine percent), Army (one percent). Exact personnel numbers are classified.

National Security Agency (NSA)

Headquarters: Ft. Meade, Md.
Established: 1952
Director: USAF Lt. Gen. Michael V. Hayden

Mission, Purpose, Operations

Protect US communications and produce foreign intelligence information. Tasked with two primary missions: an information assurance mission and a foreign signals intelligence mission. To accomplish these missions, the director's responsibilities include: prescribing security principles, doctrines, and procedures for the government; organizing, operating, and managing certain activities and facilities to produce foreign intelligence information; and conducting defensive information operations.

Structure

Established by a Presidential directive in 1952 as a separately organized agency within DOD under the direction, authority, and control of the Secretary of Defense, who serves as the executive agent of the US government for the foreign signals intelligence and communications security activities of the government. A 1984 Presidential directive charged the agency with an additional mission: computer security. An operations security training mission was added in 1988. The Central Security Service was established in 1972 by a Presidential memorandum to provide a more unified cryptological organization within DOD. The NSA director also serves as chief of the CSS.

Personnel

Classified.



A National Reconnaissance Office payload is launched aboard an Atlas IIAS rocket from Cape Canaveral AFS, Fla., on Oct. 10, 2001.

Space Operations



US Space Launch Sites

Military Sites (Orbital)

Cape Canaveral AFS, Fla.

Location: 28.5° N, 80° W.

Mission/operations: USAF's East Coast launch site. Launches satellites into geosynchronous orbit via ELVs. Hub of Eastern Range operations for civil, military, and commercial space launches and military ballistic missile tests.

Launches: 583.

Launch vehicles: Athena I, II; Atlas II, III, V; Delta II, III, IV; Titan IV.

History: Designated simply as Operating Sub-Division #1 in 1950, it became Cape Canaveral Missile Test Annex and, for a time, Cape Kennedy Air Force Station, then it became Cape Canaveral Air Force Station again in 1974.

Acres: 15,700.

Vandenberg AFB, Calif.

Location: 35° N, 121° W.

Mission/operations: USAF's West Coast launch site. Satellite (weather, remote sensing, navigation, communications, and reconnaissance) launches into polar orbits via ELVs; sole site for test launches of USAF ICBM fleet; basic support for R&D tests for DOD, USAF, and NASA space, ballistic missile, and aeronautical systems; facilities and essential services for more than 60 aerospace contractors on base.

Launches: 620.

Launch vehicles: Athena I; Atlas II, III, V; Delta II, III, IV; Pegasus; Taurus; Titan II, IV.

History: Originally Army's Camp Cooke, turned over to Air Force January 1957. Renamed Vandenberg Oct. 4, 1958.

Acres: 99,099.

Civil/Commercial Sites (Orbital)

Alaska Spaceport

Location: 57.5° N, 153° W.

Mission/operations: Commercial launch facility for polar and near-polar launches of communications, remote sensing, and scientific satellites up to 8,000 pounds.

Launches: Six.

Launch vehicles: Athena I, suborbital.

History: Established in 1998; funded through Alaska Aerospace Development Corp.

Acres: 3,100.

Florida Space Authority

Location: 28.5° N, 80° W.

Mission/operations: Various launch complexes and support facilities developed, operated, or financed by the state of Florida at the Cape Canaveral Spaceport (comprising Cape Canaveral Air Force Station and Kennedy Space Center). FSA developed or owns infrastructure at launch complexes 37 and 41 and manages a multiuser launch control facility, space experiments research and processing laboratory, and other facilities.

Launch vehicles: Athena I, II; Minotaur; Minuteman III; Taurus; Terrier.

History: Established in 1989.

John F. Kennedy Space Center, Fla.

Location: 28° N, 80° W.

Mission/operations: NASA's primary launch base for space shuttle.

Launches: 133.

Launch vehicles: Pegasus, space shuttle, Taurus.

History: NASA began acquiring land across the Banana River from Cape Canaveral in 1962. By 1957, its first launch complex—Complex 39—was operational. KSC facilities were modified in the mid to late 1970s to accommodate the space shuttle program.

Acres: 140,000 (land and water).

Sea Launch

Location: Equator, 154° W, Pacific Ocean.

Mission/operations: Provide heavy lift GEO launch services for commercial customers worldwide. Sea Launch is owned by an international partnership: Boeing, RSC Energia, Anglo-Norwegian Kvaerner Group, and SDO Yuzhnoye/PO Yuzhmash.

Launches: Eight.

Launch vehicles: Zenit-3SL.

History: Established in April 1995; demonstration launch March 1999.

Spaceport Systems Intl., L.P.

Location: 34.70° N, 120.46° W.

Mission/operations: Polar and near-polar LEO launches from Vandenberg; payload processing and launches for commercial, NASA, and USAF customers; small to medium launch vehicles up to one million pound thrust; payload processing facility for small and heavy satellites.

Launches: Two.

Launch vehicles: MM II class.

History: SSI, a limited partnership formed by ITT and California Commercial Spaceport, Inc., achieved full operational status of the spaceport in May 1999.

Virginia Space Flight Center

Location: 38° N, 76° W (south end of Wallops Flight Facility).

Mission/operations: State-owned, commercially operated launch facility for access to inclined and sun-synchronous orbits; recovery support for ballistic and guided re-entry vehicles; vehicle and payload storage and processing facilities; two commercially licensed launchpads and suborbital launch rails for commercial, military, scientific, and experimental launch customers.

Operator: DynSpace Corp.

Launches: 13 (since 1995).

Launch vehicles: Athena I, II; Black Brant; Lockheed Martin HYSR; Minotaur; Orion; Pegasus; Taurus; Terrier.

Wallops Flight Facility, Va.

Location: 38° N, 76° W.

Mission/operations: East Coast launch site for Orbital Sciences' Pegasus and DOD missions.

Launches: 30 (orbital).

Launch vehicles: Pegasus.

History: Established in 1945, it is one of world's oldest launch sites.

Acres: 6,166.

Note: Launches 1957-2002, except where noted.

Military Functions in Space

Communications

Provide communications from national leaders to Joint Force Commander. Provide communications from JFC to squadron-level commanders. Permit transfer of imagery and situational awareness to tactical operations. Permit rapid transmission of JFC intent, ground force observations, and adaptive planning.

Environmental/Remote Sensing

Use space systems to create topographical, hydrographic, and geological maps and charts and to develop systems of topographic measurement.

Force Application

US Strategic Command is identifying potential future roles, missions, and systems, which, if authorized by civilian leadership for development and deployment, could attack terrestrial and space targets from space in support of national defense.

Missile Defense

Employ space assets to support identification, acquisition, tracking,

and destruction of ballistic and cruise missiles launched against forward deployed US forces, allied forces, or US territory.

Navigation and Timing

Operate GPS network. Enable commanders to determine precise locations of friendly and enemy forces and targets. Permit accurate, timely rendezvous of combat forces. Map minefields and other obstacles. Provide precise time standard for forces deployed globally.

On-Orbit Support

Track and control satellites, operate their payloads, and disseminate data from them.

Reconnaissance and Surveillance

Observation of space, air, and surface areas through visual, electronic, photographic, or other means to provide situational awareness of a given area or activity. Access to specific targets, allowing data collection focused on specific events of interest. Enhance the reaction time of information users

and cue other systems. Support the full range of intelligence activities and operational mission planning and execution.

Space Control

Control and exploit space using offensive and defensive measures to ensure that friendly forces can use space capabilities, while denying their use to the enemy. The ability to execute offensive and defensive measures is predicated on precise space situational awareness. Space situational awareness is an understanding of all space-related activity, both on the ground and in space. This mission is assigned to commander, STRATCOM, in the Unified Command Plan.

Space Environment/Meteorological Support

Operate ground-based systems and direct National Oceanic and Atmospheric Administration on the operations of space-based DMSP weather satellite systems to provide solar/geophysical support to the warfighter. Provide data on worldwide and local weather systems affecting combat operations.

Spacelift

Oversee satellite and booster preparation and integration. Conduct launch countdown activities. Operate Eastern and Western Ranges to support the safe conduct of spacelift missions, ballistic missile test and evaluations, and aeronautical/guided weapons test and evaluations.

Strategic Early Warning

Operate satellites to give national leaders early warning of all possible strategic events, including launch of ICBMs. Identify launch locations and impact areas. Cue area and point defense systems.

Tactical Warning/Attack Assessment

Execute the NORAD mission calling for use of all sensors to detect and characterize an attack on US or Canadian territory. STRATCOM carries out similar tactical warning in other theaters.

DOD photo



A Titan IVB launches a Milstar military communications satellite into orbit April 8 from Cape Canaveral AFS, Fla. It was the last Milstar needed to complete the constellation.

US Military/Civil Launches
(As of Dec. 31, 2002)

| Launch Year | Military | Civil* | Total |
|--------------|------------|------------|--------------|
| 1958 | 0 | 7 | 7 |
| 1959 | 6 | 5 | 11 |
| 1960 | 11 | 5 | 16 |
| 1961 | 19 | 10 | 29 |
| 1962 | 32 | 20 | 52 |
| 1963 | 25 | 13 | 38 |
| 1964 | 33 | 24 | 57 |
| 1965 | 34 | 29 | 63 |
| 1966 | 35 | 38 | 73 |
| 1967 | 29 | 29 | 58 |
| 1968 | 23 | 22 | 45 |
| 1969 | 17 | 23 | 40 |
| 1970 | 18 | 11 | 29 |
| 1971 | 16 | 16 | 32 |
| 1972 | 14 | 17 | 31 |
| 1973 | 11 | 12 | 23 |
| 1974 | 8 | 16 | 24 |
| 1975 | 9 | 19 | 28 |
| 1976 | 11 | 15 | 26 |
| 1977 | 10 | 14 | 24 |
| 1978 | 14 | 18 | 32 |
| 1979 | 8 | 8 | 16 |
| 1980 | 8 | 5 | 13 |
| 1981 | 7 | 11 | 18 |
| 1982 | 6 | 12 | 18 |
| 1983 | 8 | 14 | 22 |
| 1984 | 11 | 11 | 22 |
| 1985 | 4 | 13 | 17 |
| 1986 | 4 | 2 | 6 |
| 1987 | 6 | 2 | 8 |
| 1988 | 8 | 4 | 12 |
| 1989 | 11 | 7 | 18 |
| 1990 | 11 | 16 | 27 |
| 1991 | 6 | 12 | 18 |
| 1992 | 11 | 17 | 28 |
| 1993 | 12 | 11 | 23 |
| 1994 | 11 | 15 | 26 |
| 1995 | 9 | 18 | 27 |
| 1996 | 11 | 22 | 33 |
| 1997 | 9 | 28 | 37 |
| 1998 | 5 | 29 | 34 |
| 1999 | 7 | 23 | 30 |
| 2000 | 11 | 17 | 28 |
| 2001 | 7 | 14 | 21 |
| 2002 | 1 | 16 | 17 |
| Total | 567 | 690 | 1,257 |

US Satellites Placed in Orbit and Deep Space
(As of Dec. 31, 2002)

| Launch Year | Military | Civil* | Total |
|--------------|------------|------------|--------------|
| 1958 | 0 | 7 | 7 |
| 1959 | 6 | 5 | 11 |
| 1960 | 12 | 5 | 17 |
| 1961 | 20 | 12 | 32 |
| 1962 | 35 | 20 | 55 |
| 1963 | 33 | 22 | 55 |
| 1964 | 44 | 25 | 69 |
| 1965 | 49 | 39 | 88 |
| 1966 | 52 | 47 | 99 |
| 1967 | 51 | 34 | 85 |
| 1968 | 35 | 26 | 61 |
| 1969 | 32 | 27 | 59 |
| 1970 | 23 | 8 | 31 |
| 1971 | 26 | 18 | 44 |
| 1972 | 18 | 14 | 32 |
| 1973 | 14 | 10 | 24 |
| 1974 | 11 | 8 | 19 |
| 1975 | 12 | 16 | 28 |
| 1976 | 17 | 12 | 29 |
| 1977 | 14 | 6 | 20 |
| 1978 | 16 | 17 | 33 |
| 1979 | 10 | 7 | 17 |
| 1980 | 12 | 4 | 16 |
| 1981 | 7 | 10 | 17 |
| 1982 | 8 | 9 | 17 |
| 1983 | 16 | 12 | 28 |
| 1984 | 17 | 16 | 33 |
| 1985 | 13 | 17 | 30 |
| 1986 | 7 | 4 | 11 |
| 1987 | 10 | 1 | 11 |
| 1988 | 11 | 9 | 20 |
| 1989 | 15 | 9 | 24 |
| 1990 | 22 | 16 | 38 |
| 1991 | 17 | 18 | 35 |
| 1992 | 12 | 17 | 29 |
| 1993 | 12 | 18 | 30 |
| 1994 | 18 | 19 | 37 |
| 1995 | 15 | 24 | 39 |
| 1996 | 16 | 24 | 40 |
| 1997 | 10 | 82 | 92 |
| 1998 | 7 | 90 | 97 |
| 1999 | 8 | 73 | 81 |
| 2000 | 12 | 40 | 52 |
| 2001 | 8 | 23 | 31 |
| 2002 | 2 | 25 | 27 |
| Total | 805 | 945 | 1,750 |

Note: Data changes in prior years in the table above are based on recategorization of civil to military launches.

*Includes some military payloads.

Built In Heritage



Since 1973, AMERICOM has proudly served both defense and civilian agencies and their commercial contractors.

AMERICOM GOVERNMENT SERVICES (AGS) now continues that tradition. Covering every region of the world with SES GLOBAL's leading fleet of geosynchronous communications satellites, AGS provides highly secure, fully integrated communications solutions.

From transponder leases to custom networks, AGS delivers industry-leading experience, quality and reliability with connections to more than 75 earth stations throughout the U.S. and around the world.

Share in our heritage of customer success.

For more information, please call +1-609-987-4500.

 **AMERICOM**
GOVERNMENT SERVICES

Upcoming Shuttle Flights

| Month/Year* | Mission | Name |
|-------------|---------|------------------|
| TBD | STS-114 | <i>Atlantis</i> |
| TBD | STS-115 | <i>Endeavour</i> |
| TBD | STS-116 | <i>Atlantis</i> |
| TBD | STS-117 | <i>Endeavour</i> |
| TBD | STS-118 | <i>TBD</i> |
| TBD | STS-119 | <i>Atlantis</i> |
| TBD | STS-120 | <i>TBD</i> |

*Flight dates are under review following the February 2003 loss of *Columbia* and crew.

US Military Payloads by Mission, 1958-2002 (Orbital only)

| Category | Number |
|--|------------|
| Applications | 336 |
| <i>Communications</i> | 121 |
| <i>Weather</i> | 43 |
| <i>Navigation</i> | 88 |
| <i>Launch vehicle/spacecraft tests</i> | 3 |
| <i>Other military</i> | 81 |
| Weapons-Related Activities | 46 |
| <i>SDI tests</i> | 11 |
| <i>Antisatellite targets</i> | 2 |
| <i>Antisatellite interceptors</i> | 33 |
| Reconnaissance | 434 |
| <i>Photographic/radar imaging</i> | 250 |
| <i>Electronic intelligence</i> | 48 |
| <i>Ocean surveillance</i> | 45 |
| <i>Nuclear detection</i> | 12 |
| <i>Radar calibration</i> | 40 |
| <i>Early warning</i> | 39 |
| Total | 816 |

US Manned Spaceflights

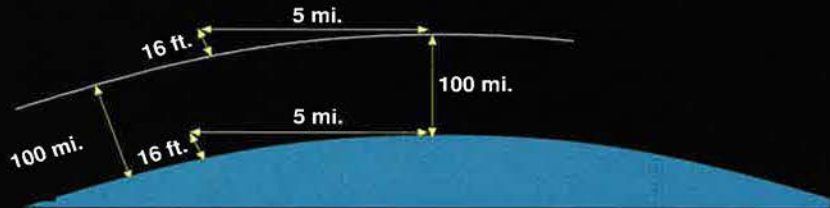
| Year | Flights | Persons |
|--------------|------------|------------|
| 1961 | 2 | 2 |
| 1962 | 3 | 3 |
| 1963 | 1 | 1 |
| 1964 | 0 | 0 |
| 1965 | 5 | 10 |
| 1966 | 5 | 10 |
| 1967 | 0 | 0 |
| 1968 | 2 | 6 |
| 1969 | 4 | 12 |
| 1970 | 1 | 3 |
| 1971 | 2 | 6 |
| 1972 | 2 | 6 |
| 1973 | 3 | 9 |
| 1974 | 0 | 0 |
| 1975 | 1 | 3 |
| 1976 | 0 | 0 |
| 1977 | 0 | 0 |
| 1978 | 0 | 0 |
| 1979 | 0 | 0 |
| 1980 | 0 | 0 |
| 1981 | 2 | 4 |
| 1982 | 3 | 8 |
| 1983 | 4 | 20 |
| 1984 | 5 | 28 |
| 1985 | 9 | 58 |
| 1986 | 1 | 7 |
| 1987 | 0 | 0 |
| 1988 | 2 | 10 |
| 1989 | 5 | 25 |
| 1990 | 6 | 32 |
| 1991 | 6 | 35 |
| 1992 | 8 | 53 |
| 1993 | 7 | 42 |
| 1994 | 7 | 42 |
| 1995 | 7 | 42 |
| 1996 | 7 | 43 |
| 1997 | 8 | 53 |
| 1998 | 5 | 33 |
| 1999 | 3 | 19 |
| 2000 | 5 | 32 |
| 2001 | 6 | 38 |
| 2002 | 5 | 34 |
| Total | 142 | 729 |



A Boeing Delta IV on March 10 launched the first DOD payload aboard an Evolved Expendable Launch Vehicle. The Delta IV boosted a Defense Satellite Communications System III satellite into orbit from Cape Canaveral AFS, Fla.

Orbits

Orbits result from the mutual attraction of any two bodies with a force proportional to the product of their individual masses and inversely proportional to the square of the distance between them. The curvature of the Earth, on average, drops 16 feet below the horizontal over a distance of about five miles. A spacecraft circling above would "fall" that same amount over the same distance. It travels five miles in one second if gravitational pull equals one G. Therefore, spacecraft velocity of five miles per second (18,000 mph) produces perpetual orbit at sea level, unless the spacecraft's flight is upset by perturbations, such as solar wind or mechanical anomalies.

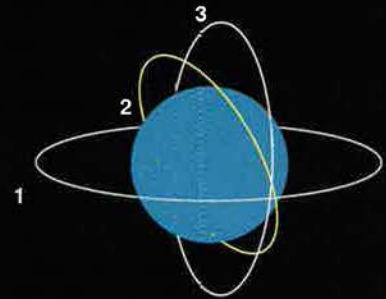
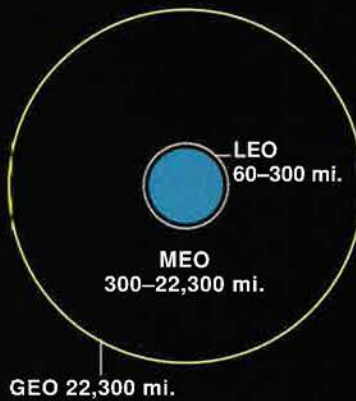


Orbital Altitude

- LEO Low Earth Orbit
- MEO Medium Earth Orbit
- GEO Geosynchronous Earth Orbit
- HEO High Earth Orbit

Orbital Inclinations

- 1 Equatorial
- 2 Sun synchronous
- 3 Polar



Geosynchronous Transfer Orbit



It is common procedure to pick an initial "parking" orbit, usually at LEO, then boost payloads to higher altitude. Engines are fired first (at perigee) to reach the apogee of an elliptical transfer orbit and then are fired again to put the spacecraft into a circular orbit at that higher altitude.

Illustrations are not drawn to scale.

Space Shuttle Flights, 1981-2003

(As of June 19, 2003)

| Flight | Mission | Launch | Return | Flight | Mission | Launch | Return |
|--------|---------|----------|------------|--------|----------|----------|------------|
| 1 | STS-1 | 4/12/81 | 4/14/81 | 58 | STS-58 | 10/18/93 | 11/1/93 |
| 2 | STS-2 | 11/12/81 | 11/14/81 | 59 | STS-61 | 12/2/93 | 12/13/93 |
| 3 | STS-3 | 3/22/82 | 3/30/82 | 60 | STS-60 | 2/3/94 | 2/11/94 |
| 4 | STS-4* | 6/27/82 | 7/4/82 | 61 | STS-62 | 3/4/94 | 3/18/94 |
| 5 | STS-5 | 11/11/82 | 11/16/82 | 62 | STS-59 | 4/9/94 | 4/20/94 |
| 6 | STS-6 | 4/4/83 | 4/9/83 | 63 | STS-65 | 7/8/94 | 7/23/94 |
| 7 | STS-7 | 6/18/83 | 6/24/83 | 64 | STS-64 | 9/9/94 | 9/20/94 |
| 8 | STS-8 | 8/30/83 | 9/5/83 | 65 | STS-68 | 9/30/94 | 10/11/94 |
| 9 | STS-9 | 11/28/83 | 12/8/83 | 66 | STS-66 | 11/3/94 | 11/14/94 |
| 10 | STS-10 | 2/3/84 | 2/11/84 | 67 | STS-63 | 2/3/95 | 2/11/95 |
| 11 | STS-11 | 4/6/84 | 4/13/84 | 68 | STS-67 | 3/2/95 | 3/18/95 |
| 12 | STS-12 | 8/30/84 | 9/5/84 | 69 | STS-71 | 6/27/95 | 7/7/95 |
| 13 | STS-13 | 10/5/84 | 10/13/84 | 70 | STS-70 | 7/13/95 | 7/22/95 |
| 14 | STS-14 | 11/8/84 | 11/16/84 | 71 | STS-69 | 9/7/95 | 9/18/95 |
| 15 | STS-15* | 1/24/85 | 1/27/85 | 72 | STS-73 | 10/20/95 | 11/5/95 |
| 16 | STS-16 | 4/12/85 | 4/19/85 | 73 | STS-74 | 11/12/95 | 11/20/95 |
| 17 | STS-17 | 4/29/85 | 5/6/85 | 74 | STS-72 | 1/11/96 | 1/20/96 |
| 18 | STS-18 | 6/17/85 | 6/24/85 | 75 | STS-75 | 2/22/96 | 3/9/96 |
| 19 | STS-19 | 7/29/85 | 8/6/85 | 76 | STS-76 | 3/22/96 | 3/31/96 |
| 20 | STS-20 | 8/27/85 | 9/3/85 | 77 | STS-77 | 5/19/96 | 5/29/96 |
| 21 | STS-21* | 10/3/85 | 10/7/85 | 78 | STS-78 | 6/20/96 | 7/7/96 |
| 22 | STS-22 | 10/30/85 | 11/6/85 | 79 | STS-79 | 9/16/96 | 9/26/96 |
| 23 | STS-23 | 11/26/85 | 12/3/85 | 80 | STS-80 | 11/19/96 | 12/7/96 |
| 24 | STS-24 | 1/12/86 | 1/18/86 | 81 | STS-81 | 1/12/97 | 1/22/97 |
| 25 | STS-25 | 1/28/86 | No Landing | 82 | STS-82 | 2/11/97 | 2/21/97 |
| 26 | STS-26 | 9/29/88 | 10/3/88 | 83 | STS-83 | 4/4/97 | 4/8/97 |
| 27 | STS-27* | 12/2/88 | 12/6/88 | 84 | STS-84 | 5/15/97 | 5/24/97 |
| 28 | STS-29 | 3/13/89 | 3/18/89 | 85 | STS-94 | 7/1/97 | 7/17/97 |
| 29 | STS-30 | 5/4/89 | 5/8/89 | 86 | STS-85 | 8/7/97 | 8/19/97 |
| 30 | STS-28* | 8/8/89 | 8/13/89 | 87 | STS-86 | 9/25/97 | 10/6/97 |
| 31 | STS-34 | 10/18/89 | 10/23/89 | 88 | STS-87 | 11/19/97 | 12/5/97 |
| 32 | STS-33* | 11/22/89 | 11/27/89 | 89 | STS-89 | 1/22/98 | 1/31/98 |
| 33 | STS-32 | 1/9/90 | 1/20/90 | 90 | STS-90 | 4/17/98 | 5/3/98 |
| 34 | STS-36* | 2/28/90 | 3/4/90 | 91 | STS-91 | 6/2/98 | 6/12/98 |
| 35 | STS-31 | 4/24/90 | 4/29/90 | 92 | STS-95 | 10/29/98 | 11/7/98 |
| 36 | STS-41 | 10/6/90 | 10/10/90 | 93 | STS-88 | 12/4/98 | 12/15/98 |
| 37 | STS-38* | 11/15/90 | 11/20/90 | 94 | STS-96 | 5/27/99 | 6/6/99 |
| 38 | STS-35 | 12/2/90 | 12/10/90 | 95 | STS-93* | 7/22/99 | 7/27/99 |
| 39 | STS-37 | 4/5/91 | 4/11/91 | 96 | STS-103 | 12/19/99 | 12/27/99 |
| 40 | STS-40 | 6/5/91 | 6/14/91 | 97 | STS-99 | 2/11/00 | 2/22/00 |
| 41 | STS-43 | 8/2/91 | 8/11/91 | 98 | STS-101 | 5/19/00 | 5/29/00 |
| 42 | STS-48 | 9/12/91 | 9/18/91 | 99 | STS-106* | 9/8/00 | 9/19/00 |
| 43 | STS-44* | 11/24/91 | 12/1/91 | 100 | STS-92 | 10/11/00 | 10/24/00 |
| 44 | STS-39* | 4/28/91 | 5/6/91 | 101 | STS-97 | 11/30/00 | 12/11/00 |
| 45 | STS-42 | 1/22/92 | 1/30/92 | 102 | STS-98* | 2/7/01 | 2/20/01 |
| 46 | STS-45 | 3/24/92 | 4/2/92 | 103 | STS-102* | 3/8/01 | 3/20/01 |
| 47 | STS-49 | 5/7/92 | 5/16/92 | 104 | STS-100 | 4/19/01 | 5/1/01 |
| 48 | STS-50 | 6/25/92 | 7/9/92 | 105 | STS-104* | 7/12/01 | 7/24/01 |
| 49 | STS-46 | 7/31/92 | 8/8/92 | 106 | STS-105* | 8/10/01 | 8/22/01 |
| 50 | STS-47 | 9/12/92 | 9/20/92 | 107 | STS-108 | 12/5/01 | 12/17/01 |
| 51 | STS-52 | 10/22/92 | 11/1/92 | 108 | STS-109 | 3/1/02 | 3/9/02 |
| 52 | STS-53* | 12/2/92 | 12/9/92 | 109 | STS-110 | 4/8/02 | 4/19/02 |
| 53 | STS-54 | 1/13/93 | 1/19/93 | 110 | STS-111 | 6/5/02 | 6/19/02 |
| 54 | STS-56 | 4/8/93 | 4/17/93 | 111 | STS-112 | 10/7/02 | 10/18/02 |
| 55 | STS-55 | 4/26/93 | 5/6/93 | 112 | STS-113 | 11/23/02 | 12/7/02 |
| 56 | STS-57 | 6/21/93 | 7/1/93 | 113 | STS-107 | 1/16/03 | No Landing |
| 57 | STS-51 | 9/12/93 | 9/22/93 | | | | |

*DOD payload.



Major Military Satellite Systems

Advanced Extremely High Frequency Satellite Communications System

Common name: AEHF
In brief: successor to Milstar, AEHF will provide assured strategic/tactical, worldwide C2 communications with at least five times the capacity of Milstar II but in a smaller package.
Function: EHF communications.
Operator: MILSATCOM JPO (acquisition); AFSPC.
First launch: 2007, planned.
Constellation: four.
Orbit altitude: 22,300 miles.
Contractor: Lockheed Martin, Northrop Grumman.
Power plant: N/A.
Dimensions: N/A.
Weight: approx 13,000 lb (on orbit).

Defense Meteorological Satellite Program

Common name: DMSP
In brief: satellites that collect air, land, sea, and space environmental data to support worldwide strategic and tactical military operations.
Function: environmental monitoring satellite.
Operator: NPOESS Integrated Program Office.
First launch: May 23, 1962.
Constellation: two (primary).
Orbit altitude: approx 575 miles.
Contractor: Lockheed Martin, Northrop Grumman.
Power plant: solar arrays, 1,200-1,300 watts.
Dimensions: width 4 ft, length 20.2 ft (with array deployed).
Weight: 2,545 lb (including 592-lb sensor).

Defense Satellite Communications System III

Common name: DSCS III
In brief: nuclear-hardened and jam-resistant spacecraft used to transmit high-priority C2 messages to battlefield commanders.
Function: SHF communications.
Operator: AFSPC.
First launch: October 1982.
Constellation: five.
On orbit: 10.
Orbit altitude: 22,000+ miles.
Contractor: Lockheed Martin.
Power plant: solar array, avg. 1,269 watts (pre-service life enhancement program); avg. 1,500 watts (SLEP; first SLEP satellite launched Jan. 20, 2000).
Dimensions: rectangular body is 6 ft x 6 ft x 7 ft; 38-ft span (deployed).
Weight: 2,580 lb (pre-SLEP); 2,716 lb (SLEP).

Defense Support Program

Common name: DSP
In brief: early warning spacecraft whose infrared sensors detect heat generated by a missile or booster plume.
Function: strategic and tactical missile launch detection.
Operator: AFSPC.
First launch: November 1970.
Constellation: classified.
On orbit: classified.
Orbit altitude: 22,000+ miles.
Contractor: Northrop Grumman.
Power plant: solar array, 1,485 watts.
Dimensions: width 22 ft (on orbit), length 32.8 ft (on orbit).
Weight: approx 5,000 lb.

Global Broadcast System

Common name: GBS
In brief: wideband communications program, initially using leased commercial satellites, then military systems, to provide digital multimedia data directly to theater warfighters.
Function: high-bandwidth data imagery and video.
Operator: Navy.
First launch: March 1998 (Phase 2 payload on UHF Follow-On).
Constellation: three; commercial augmentation.
On orbit: three.
Orbit altitude: 23,230 miles.
Contractor: Raytheon (Phase 2).
Power plant: (interim host satellite: UHF Follow-On) 3,800 watts.
Dimensions: numerous items integrated throughout host.

Global Positioning System

Common name: GPS
In brief: constellation of satellites used by military and civilians to determine a precise location and time anywhere on Earth.
Function: worldwide navigation.
Operator: AFSPC.
First launch: Feb. 22, 1978.
Constellation: 28.
Orbit altitude: 10,900 miles (Block IIA/IIR).
Contractor: Boeing, Lockheed Martin.
Power plant: solar array, 700 watts (Block IIA); 1,136 watts (Block IIR).
Dimensions: body 8 ft x 8 ft x 12 ft, including solar arrays 11 ft x 19 ft (IIA/IIA); body 3 ft x 6 ft x 10 ft, span including arrays 37 ft (IIR).
Weight: 2,174 lb (Block IIA, on orbit); 2,370 lb (Block IIR, on orbit).

Milstar Satellite Communications System

Common name: Milstar
In brief: joint communications satellite that provides secure, jam-resistant communications for essential wartime needs.
Function: EHF communications.
Operator: AFSPC.
First launch: Feb. 7, 1994.
Constellation: five.
On orbit: five.
Orbit altitude: 22,300 miles.
Contractor: Boeing, Lockheed Martin, Northrop Grumman.
Power plant: solar array, almost 5,000 watts.
Dimensions: length 51 ft; solar array 116 ft (deployed).
Weight: approx 10,000 lb.

Polar Military Satellite Communications

Common name: Polar MILSATCOM
In brief: USAF deployed a modified Navy EHF payload on a host polar-orbiting satellite to provide an interim solution for a cheaper alternative to Milstar to ensure warfighters have protected polar communications capability.
Function: polar communications.
Operator: Navy.
First launch: 1997.
Constellation: three.
On orbit: one.
Orbit altitude: 25,300 miles (apogee).
Contractor: classified.
Power plant: 410 watts consumed by payload (power from host solar array).
Dimensions: numerous items integrated throughout host.
Weight: 470 lb.

Space Based Infrared System

Common name: SBIRS
In brief: advanced surveillance system for missile warning, missile defense, battlespace characterization, and technical intelligence. System includes High (satellites in GEO and HEO) and Low (satellites in LEO) components.
Function: infrared space surveillance.
Operator: AFSPC.
First launch: planned, High FY07; Low TBD.
Constellation: High: four GEO sats, two highly elliptical orbit sensors. Low: TBD.
On orbit: none.
Contractor: Lockheed Martin (High); Northrop Grumman and Spectrum Astro for preliminary system designs (Low).
Power plant: N/A.
Dimensions: N/A.
Weight: N/A.

UHF Follow-On Satellite

Common name: UFO

In brief: new generation of satellites providing secure, anti-jam communications; replaced FLTSATCOM satellites.
Function: UHF and EHF communications.

Operator: Navy.

First launch: March 25, 1993.

Constellation: four primary, four redundant.

On orbit: nine.

Orbit altitude: 22,300 miles.

Contractor: Boeing Satellite Systems.

Power plant: solar array, 2,500-3,800 watts.

Dimensions: length 60 ft (F-2-F-7); 86 ft (F-8-F10) (deployed).

Weight: 2,600-3,400 lb.

Wideband Gap-Filler System

Common name: WGS

In brief: high data rate satellite broadcast system meant to bridge the communications gap between current systems—DSCS and GBS—and an advanced wideband system.

Function: wideband communications and point-to-point service (Ka-band, Ku-band, X-band frequencies).

Operator: AFSPC.

First launch: FY05, planned.

Constellation: three.

Orbit altitude: GEO.

Contractor: Boeing.

Power plant: solar arrays, 9,934 watts.

Dimensions: based on Boeing 702 Bus.

Weight: 13,000 lb.

Dark and Spooky

A number of intelligence satellites are operated by US agencies in cooperation with the military. The missions and, especially, the capabilities are closely guarded secrets. Using a page from the Soviet book on naming satellites, the US government started in the 1980s calling all government satellites "USA" with a sequential number. This allowed them to keep secret the names of satellites which monitor the Earth with radar, optical sensors, and electronic intercept capability. Most of the names of satellites, such as White Cloud (ocean reconnaissance), Aquacade (electronic ferret), and Trumpet (Sigint), are essentially open secrets but cannot be confirmed by the Intelligence Community. However, the move to declassify space systems has led to the release of selected information on some systems. Pictures of the Lacrosse radar imaging satellite have been released without details on the system. Details of the Keyhole optical imaging systems in the Corona program have been released.

Major Civilian Satellites in US Military Use

Advanced Communications Technology Satellite

Common name: ACTS

In brief: technology demonstration satellite for new types of K- and Ka-band communications technologies.

Function: communications.

Operator: NASA.

First launch: Sept. 12, 1993.

Constellation: one.

Orbit altitude: 22,300 miles.

Contractor: Lockheed Martin.

Power plant: solar array, 1,400 watts.

Dimensions: width 29.9 ft, length 47.1 ft (deployed).

Weight: 3,250 lb.

Geostationary Operational Environmental Satellite

Common name: GOES

In brief: in equatorial orbit to collect weather data for short-term forecasting.

Function: storm monitoring and tracking, meteorological research.

Operator: NOAA.

First launch: Oct. 16, 1975 (GOES-1).

Constellation: two.

Orbit altitude: 22,300 miles.

Contractor: Space Systems/Loral.

Power plant: solar array, 1,050 watts.

Dimensions: 8.7-ft cube, length 88.6 ft (deployed).

Weight: 4,600 lb.

Globalstar

Common name: Globalstar

In brief: mobile communications with provision for security controls.

Function: communications.

Operator: Globalstar L.P.

First launch: February 1998.

Constellation: 48.

Orbit altitude: 878 miles.

Contractor: Space Systems/Loral.

Power plant: solar array, 1,100 watts.

Dimensions: width 4.9 ft, length 35.3 ft (deployed).

Weight: 990 lb.

Ikonos

Common name: Ikonos

In brief: one-meter resolution Earth imaging.

Function: remote sensing.

Operator: Space Imaging, Inc.

First launch: Sept. 24, 1999.

Constellation: one.

Orbit altitude: 423 miles.

Contractor: Lockheed Martin.

Power plant: solar array.

Dimensions: 5.9 ft x 5.9 ft x 5.2 ft.

Weight: 1,600 lb.

Inmarsat

Common name: Inmarsat

In brief: sometimes used for peacetime mobile communications services.

Function: communications.

Operator: International Maritime Satellite Organization.

First launch: February 1982 (first lease); Oct. 30, 1990 (first launch).

Constellation: nine.

Orbit altitude: 22,300 miles.

Contractor: Lockheed Martin (Inmarsat 3).

Power plant: solar array, 2,800 watts.

Dimensions: width 6.9 ft, length 5.9 ft, 57.8 ft (deployed).

Weight: 4,545 lb (Inmarsat 3).

Intelsat

Common name: Intelsat

In brief: routine communications and distribution of Armed Forces Radio and TV Services network.

Function: communications.

Operator: International Telecommunications Satellite Organization.

First launch: April 6, 1965 (Early Bird).

Constellation: 20.

Orbit altitude: 22,300 miles.

Contractor: Lockheed Martin (Intelsat 8).

Power plant: solar array, 4,800 watts.

Dimensions: width 8.3 x 7.2 ft, length 11.3 ft, 35.4 ft (deployed) (Intelsat 8).

Weight: 7,480 lb (Intelsat 8).

Iridium

Common name: Iridium

In brief: voice, fax, data transmission.

Function: handheld, mobile communications.

Operator: Iridium L.L.C.

First launch: May 5, 1997.

Constellation: 66 (six on-orbit spares).

Orbit: 485 miles.

Contractor: Lockheed Martin, Motorola.

Power plant: solar array, 590 watts.

Dimensions: diameter 3.3 ft, length 13.5 ft.

Weight: 1,516 lb.

Landsat

Common name: Landsat

In brief: imagery use includes mapping and planning for tactical operations.

Function: remote sensing.

Operator: NASA/NOAA.

First launch: July 23, 1972.

Constellation: one.

Orbit altitude: 438 miles (polar).

Contractor: Lockheed Martin.

Power plant: solar array, 1,550 watts.

Dimensions: diameter 9 ft, length 14 ft.

Weight: 4,800 lb.

Loral Orion

Common name: Telstar (formerly Orion)

In brief: commercial satellite-based, rooftop-to-rooftop communications for US Army and other DOD agencies.

Function: communications.

Operator: Loral Orion.

First launch: November 1994.

Constellation: three.

Orbit altitude: 22,300 miles.

Contractor: Space Systems/Loral (Orion 2).

Power plant: solar array, 7,000 watts.

Dimensions: width 5.6 ft, length 6.9 ft, 72.2 ft (deployed).

Weight: 8,360 lb (Orion 2).

BEEN THERE



DONE THAT

CAN DO IT

AGAIN

AND AGAIN

AND AGAIN...

**LAUNCH AVIONICS
AND SPACECRAFT ELECTRONICS**



The advances in space technology during the last half of the twentieth century bear the distinctive trademark of CMC Electronics Cincinnati, Space Products Division. Our flight heritage, which began in 1953, provides designers and operators of commercial/governmental launch vehicles and spacecraft with unparalleled application and technical experience. Call, fax, write or e-mail us for all your launch vehicle avionics, space telemetry and advanced electronics communications, and command requirements... now and into the next Millennium.

cmc electronics
C I N C I N N A T I

Space Electronics - 7500 Innovation Way - Mason, Ohio 45040-9699 U.S.A.

Tel: 513-573-6505 - Fax: 513-573-6767 - Phone toll-free: 1-800-543-8220 - Visit our Web site at www.cinele.com - e-mail: ldobbs@cinele.com

NOAA-15 (NOAA-K) and NOAA-16 (NOAA-L)

Common name: NOAA (with number on orbit) (also known as Television Infrared Observation Satellite or TIROS)
In brief: weather updates for all areas of the world every six hours.
Function: long-term weather forecasting.
Operator: NOAA (on-orbit); NASA (launch).
First launch: October 1978 (TIROS-N).
Constellation: two.
Orbit altitude: 517 miles.
Contractor: Lockheed Martin.
Power plant: solar array, 1,000+ watts.
Dimensions: diameter 6.2 ft, length 13.8 ft (NOAA-15).
Weight: approx. 4,900 lb (NOAA-15).

Orbcomm

Common name: Orbcomm
In brief: potential military use under study in Joint Interoperability Warfighter Program.
Function: mobile communications.
Operator: Orbcomm Global L.P.
First launch: April 1995.
Constellation: 35.
Orbit altitude: 500-1,200 miles.
Contractor: Orbital Sciences.
Power plant: solar array, 160 watts.
Dimensions: width 7.3 ft, length 14.2 ft.
Weight: 90 lb.

Pan Am Sat

Common name: Pan Am Sat
In brief: routine communications providing telephone, TV, radio, and data.
Function: communications.
Operator: Pan Am Sat.
First launch: 1983.
Constellation: 21.
Orbit altitude: 22,300 miles.
Contractor: Boeing.
Power plant: solar array, 4,800 watts.
Dimensions: 16.2 ft x 8.8 ft x 12 ft width (stowed) (Galaxy III-R). Length solar arrays: 86 ft width, antenna 24 ft (Galaxy III-R).
Weight: 6,760 lbs (Galaxy III-R).

Quickbird 2

Common name: Quickbird 2
In brief: high-resolution imagery for mapping, military surveillance, weather research, and other uses.
Function: remote sensing.
Operator: Digital Globe.
First launch: Oct. 18, 2001.
Constellation: one.
Orbit altitude: 279 miles.
Contractor: Ball Aerospace.
Power plant: solar array.
Dimensions: 9.8 ft x 5.2 ft x 5.2 ft.
Weight: 2,088 lb.

Satellite Pour l'Observation de la Terre

Common name: SPOT
In brief: terrain images used for mission-planning systems, terrain analysis, and mapping.
Function: remote sensing.
Operator: SPOT Image S.A. (France).
First launch: Feb. 22, 1986.
Constellation: three.
Orbit altitude: 509 miles.
Contractor: Matra Marconi Space France.
Power plant: solar array, 2,100 watts (SPOT 4).
Dimensions: 6.6 x 6.6 x 18.4 ft (SPOT 4).
Weight: 5,940 lb (SPOT 4).

Tracking and Data Relay Satellite System

Common name: TDRSS
In brief: global network that allows other spacecraft in LEO to communicate with a control center without an elaborate network of ground stations.
Function: communications relay.
Operator: NASA.
First launch: April 1983.
Constellation: six.
Orbit altitude: 22,300 miles.
Contractor: TRW/Northrop Grumman.
Power plant: solar array, 1,800 watts.
Dimensions: width 45.9 ft, length 57.4 ft (deployed).
Weight: 5,000 lb.

Major US Launchers in US Military Use

Athena I

Function: lift low to medium weights.
First launch: Aug. 22, 1997.
Launch site: CCAFS, VAFB.
Contractor: Lockheed Martin.

Athena II

Function: lift low to medium weights.
First launch: Jan. 6, 1998.
Launch site: CCAFS, VAFB.
Contractor: Lockheed Martin.

Atlas II

Function: lift medium weights.
Variants: IIA and IIAS.
First launch: Dec. 7, 1991.
Launch site: CCAFS, VAFB.
Contractor: Lockheed Martin.

Atlas III

Function: lift medium to heavy weights.
Variants: IIIA and IIIB.
First launch: May 24, 2000 (IIIA).
Launch site: CCAFS, VAFB.
Contractor: Lockheed Martin.

Atlas V

Function: lift medium to heavy weights.
First launch: Aug. 21, 2002.
Launch site: CCAFS, VAFB.
Contractor: Lockheed Martin.

Delta II

Function: lift medium weights.
First launch: Feb. 14, 1989.
Launch site: CCAFS, VAFB.
Contractor: Boeing.

Delta III

Function: lift medium weights.
First launch: Aug. 26, 1998.
Launch site: CCAFS.
Contractor: Boeing.

Delta IV

Function: lift medium to heavy weights.
First launch: Nov. 20, 2002.
Launch site: CCAFS, VAFB.
Contractor: Boeing.

Evolved Expendable Launch Vehicle

Function: lift medium to heavy weights.
Note: Atlas V and Delta IV (see individual entries) are participating in USAF's EELV modernization program to cut launch costs by 25 to 50 percent. These systems will eventually replace Delta II, Atlas II, Titan II, and Titan IV launch vehicles.

Pegasus

Function: lift low weights.
Variants: Standard and XL.
First launch: (Standard) April 5, 1990; (XL) June 27, 1994.
Launch site: dropped from L-1011 aircraft.
Contractor: Orbital Sciences, Alliant.

Space Shuttle

Function: lift heavy weights.
First launch: April 12, 1981.
Launch site: Kennedy Space Center, Fla.
Contractor: Boeing.

Taurus

Function: lift low weights.
First launch: March 13, 1994.
Launch site: CCAFS, VAFB, Wallops Is.
Contractor: Orbital Sciences.

Titan II

Function: lift low to medium weights.
First launch: April 8, 1964 (NASA).
Launch site: VAFB.
Contractor: Lockheed Martin.

Titan IVB

Function: lift heavy weights.
First launch: (IVB) Feb. 23, 1997.
Launch site: CCAFS, VAFB.
Contractor: Lockheed Martin.

Foreign Space Activities



Foreign Orbital Launches

(As of Dec. 31, 2002)

| Year | China | ESA | France | India | Israel | Japan | Russia | UK |
|--------------|-----------|------------|-----------|-----------|----------|-----------|--------------|----------|
| 1965 | | | 1 | | | | 48 | |
| 1966 | | | 1 | | | | 44 | |
| 1967 | | | 2 | | | | 66 | |
| 1968 | | | | | | | 74 | |
| 1969 | | | | | | | 70 | |
| 1970 | 1 | | 2 | | | 1 | 81 | |
| 1971 | 1 | | 1 | | | 2 | 83 | 1 |
| 1972 | | | | | | 1 | 74 | |
| 1973 | | | | | | | 86 | |
| 1974 | | | | | | 1 | 81 | |
| 1975 | 3 | | 3 | | | 2 | 89 | |
| 1976 | 2 | | | | | 1 | 99 | |
| 1977 | | | | | | 2 | 98 | |
| 1978 | 1 | | | | | 3 | 88 | |
| 1979 | | 1 | | | | 2 | 87 | |
| 1980 | | | | 1 | | 2 | 89 | |
| 1981 | 1 | 2 | | 1 | | 3 | 98 | |
| 1982 | 1 | | | | | 1 | 101 | |
| 1983 | 1 | 2 | | 1 | | 3 | 98 | |
| 1984 | 3 | 4 | | | | 3 | 97 | |
| 1985 | 1 | 3 | | | | 2 | 98 | |
| 1986 | 2 | 2 | | | | 2 | 91 | |
| 1987 | 2 | 2 | | | | 3 | 95 | |
| 1988 | 4 | 7 | | | 1 | 2 | 90 | |
| 1989 | | 7 | | | | 2 | 74 | |
| 1990 | 5 | 5 | | | 1 | 3 | 75 | |
| 1991 | 1 | 8 | | | | 2 | 59 | |
| 1992 | 4 | 7 | | 1 | | 1 | 54 | |
| 1993 | 1 | 7 | | | | 1 | 47 | |
| 1994 | 5 | 6 | | 2 | | 2 | 48 | |
| 1995 | 2 | 11 | | | 1 | 1 | 32 | |
| 1996 | 3 | 10 | | 1 | | 1 | 25 | |
| 1997 | 6 | 12 | | 1 | | 2 | 28 | |
| 1998 | 6 | 11 | | | | 2 | 24 | |
| 1999 | 4 | 10 | | 1 | | | 28 | |
| 2000 | 5 | 12 | | | | | 35 | |
| 2001 | 1 | 8 | | 2 | | 1 | 25 | |
| 2002 | 4 | 11 | | 1 | 1 | 3 | 25 | |
| Total | 70 | 148 | 10 | 12 | 4 | 57 | 2,604 | 1 |

Russian Military vs. Civil Launches

(As of Dec. 31, 2002)

| Year | Military | Civilian | Total |
|--------------|--------------|--------------|--------------|
| 1957 | 0 | 2 | 2 |
| 1958 | 0 | 1 | 1 |
| 1959 | 0 | 3 | 3 |
| 1960 | 0 | 3 | 3 |
| 1961 | 0 | 6 | 6 |
| 1962 | 5 | 15 | 20 |
| 1963 | 7 | 10 | 17 |
| 1964 | 15 | 15 | 30 |
| 1965 | 25 | 23 | 48 |
| 1966 | 27 | 17 | 44 |
| 1967 | 46 | 20 | 66 |
| 1968 | 49 | 25 | 74 |
| 1969 | 51 | 19 | 70 |
| 1970 | 55 | 26 | 81 |
| 1971 | 60 | 23 | 83 |
| 1972 | 53 | 21 | 74 |
| 1973 | 58 | 28 | 86 |
| 1974 | 52 | 29 | 81 |
| 1975 | 60 | 29 | 89 |
| 1976 | 74 | 25 | 99 |
| 1977 | 69 | 29 | 98 |
| 1978 | 60 | 28 | 88 |
| 1979 | 60 | 27 | 87 |
| 1980 | 64 | 25 | 89 |
| 1981 | 59 | 39 | 98 |
| 1982 | 68 | 33 | 101 |
| 1983 | 58 | 40 | 98 |
| 1984 | 63 | 34 | 97 |
| 1985 | 64 | 34 | 98 |
| 1986 | 63 | 28 | 91 |
| 1987 | 62 | 33 | 95 |
| 1988 | 53 | 37 | 90 |
| 1989 | 42 | 32 | 74 |
| 1990 | 45 | 30 | 75 |
| 1991 | 30 | 29 | 59 |
| 1992 | 32 | 22 | 54 |
| 1993 | 26 | 21 | 47 |
| 1994 | 26 | 22 | 48 |
| 1995 | 15 | 17 | 32 |
| 1996 | 8 | 17 | 25 |
| 1997 | 10 | 18 | 28 |
| 1998 | 9 | 15 | 24 |
| 1999 | 6 | 22 | 28 |
| 2000 | 7 | 28 | 35 |
| 2001 | 9 | 16 | 25 |
| 2002 | 7 | 18 | 25 |
| Total | 1,652 | 1,034 | 2,686 |

Russian Military Launches for 2002

| | Launches | Spacecraft |
|---------------------------------------|----------|------------|
| Communications | 1 | 2 |
| Early warning | 2 | 2 |
| Electronic intelligence (ocean recon) | 0 | 0 |
| Navigation | 2 | 4 |
| Photoreconnaissance | 2 | 2 |
| Total | 7 | 10 |

Russian Operational Military Spacecraft

(As of Dec. 31, 2002)

| Mission | Type | Number |
|--------------------------------|--------------------|--------|
| Communications | Kosmos (Geizer) | 1 |
| | Kosmos (Strela-3) | 6 |
| | Molniya-1T | 5 |
| | Molniya-3 | 6 |
| | Raduga/Raduga-1 | 6 |
| Early warning | Kosmos (Okol) | 5 |
| | Kosmos (Prógnoz) | 1 |
| Electronic intelligence | Kosmos (EORSAT) | 1 |
| | Kosmos (Tselina-2) | 1 |
| Navigation | Kosmos (GLONASS)* | 10 |
| | Kosmos (Parus) | 6 |
| Photoreconnaissance | Kosmos (Araks) | 1 |

*Kosmos (GLONASS) is both civilian and military.

Russian Launch Site Activity

(As of Dec. 31, 2002)

| Vehicle | Number of launches |
|---|--------------------|
| Baikonur Cosmodrome, Tyuratam, Kazakhstan | |
| Dnepr | 1 |
| Proton-K/Blok DM-2 | 2 |
| Proton-K/Blok DM-2M | 1 |
| Proton-K/Blok DM-3 (commercial version) | 4 |
| Proton-K/Blok DM-5 | 1 |
| Proton-M/Briz-M | 1 |
| Soyuz-FG | 3 |
| Soyuz-U | 2 |
| Total | 15 |
| Odyssey Platform, Pacific Ocean (Sea Launch) | |
| Zenit-3SL | 1 |
| Total | 1 |
| Plesetsk Cosmodrome, Plesetsk, Russia | |
| Kosmos-3M | 4 |
| Molniya-M | 2 |
| Rokot/Briz-KM | 2 |
| Soyuz-U | 1 |
| Total | 9 |

Russian Military/Civil Payloads by Mission, 1957-2002

(As of Dec. 31, 2002)

| | |
|--|--------------|
| Antisatellite target tests | 18 |
| Antisatellite interceptor tests | 20 |
| Communications | 328 |
| Early warning | 82 |
| Earth orbital science | 212 |
| Earth resources | 100 |
| Electronic intelligence | 133 |
| Fractional orbital bombardment system tests | 18 |
| General engineering and materials processing | 16 |
| Geodesy | 34 |
| Navigation | 232 |
| Ocean electronic intelligence | 85 |
| Photographic reconnaissance | 808 |
| Theater communication | 535 |
| Undefined military operations | 162 |
| Weather | 75 |
| Total | 2,858 |

Russian Manned Spaceflights

(As of Dec. 31, 2002)

| Year | Flights | Persons* |
|--------------|-----------|------------|
| 1961 | 2 | 2 |
| 1962 | 2 | 2 |
| 1963 | 2 | 2 |
| 1964 | 1 | 3 |
| 1965 | 1 | 2 |
| 1966 | 0 | 0 |
| 1967 | 1 | 1 |
| 1968 | 1 | 1 |
| 1969 | 5 | 11 |
| 1970 | 1 | 2 |
| 1971 | 2 | 6 |
| 1972 | 0 | 0 |
| 1973 | 2 | 4 |
| 1974 | 3 | 6 |
| 1975 | 4 | 8 |
| 1976 | 3 | 6 |
| 1977 | 3 | 6 |
| 1978 | 5 | 10 |
| 1979 | 2 | 4 |
| 1980 | 6 | 13 |
| 1981 | 3 | 6 |
| 1982 | 3 | 8 |
| 1983 | 2 | 5 |
| 1984 | 3 | 9 |
| 1985 | 2 | 5 |
| 1986 | 1 | 2 |
| 1987 | 3 | 8 |
| 1988 | 3 | 9 |
| 1989 | 1 | 2 |
| 1990 | 3 | 7 |
| 1991 | 2 | 6 |
| 1992 | 2 | 6 |
| 1993 | 2 | 5 |
| 1994 | 3 | 8 |
| 1995 | 2 | 6 |
| 1996 | 2 | 5 |
| 1997 | 2 | 5 |
| 1998 | 2 | 6 |
| 1999 | 1 | 3 |
| 2000 | 2 | 5 |
| 2001 | 2 | 6 |
| 2002 | 2 | 6 |
| Total | 94 | 217 |

*Total number of persons who flew in space in a given year. Some individuals made multiple flights.

AP photo/NASA



| Spacefarers (As of Dec. 31, 2002) | |
|--------------------------------------|------------|
| Nation | Persons |
| Afghanistan | 1 |
| Austria | 1 |
| Belgium | 2 |
| Bulgaria | 2 |
| Canada | 8 |
| Cuba | 1 |
| Czechoslovakia | 1 |
| France | 9 |
| Germany | 9 |
| Hungary | 1 |
| India | 1 |
| Italy | 4 |
| Japan | 5 |
| Mexico | 1 |
| Mongolia | 1 |
| Netherlands | 1 |
| Poland | 1 |
| Romania | 1 |
| Russia | 97 |
| Saudi Arabia | 1 |
| Slovakia | 1 |
| South Africa | 1 |
| Spain | 1 |
| Switzerland | 1 |
| Syria | 1 |
| Ukraine | 1 |
| United Kingdom | 1 |
| United States | 269 |
| Vietnam | 1 |
| Total | 425 |

| Payloads in Orbit (As of Dec. 31, 2002) | |
|---|--------------|
| Launcher/operator | Objects |
| Russia | 1,357 |
| United States | 1,031 |
| Japan | 82 |
| Intl. Telecommunications Satellite Orgn. | 59 |
| France | 52 |
| ESA | 43 |
| China | 38 |
| United Kingdom | 30 |
| India | 23 |
| Germany | 21 |
| Canada | 18 |
| Italy | 13 |
| Luxembourg | 13 |
| Brazil | 10 |
| Saudi Arabia | 10 |
| Sweden | 10 |
| Australia | 9 |
| Indonesia | 9 |
| NATO | 8 |
| Argentina | 7 |
| South Korea | 7 |
| Mexico | 6 |
| Spain | 6 |
| Netherlands | 5 |
| Czechoslovakia | 4 |
| International Space Station | 4 |
| Israel | 4 |
| Thailand | 4 |
| Turkey | 4 |
| Malaysia | 3 |
| Norway | 3 |
| Egypt | 2 |
| France/Germany | 2 |
| Philippines | 2 |
| Algeria | 1 |
| Chile | 1 |
| Denmark | 1 |
| Pakistan | 1 |
| Portugal | 1 |
| Singapore | 1 |
| South Africa | 1 |
| Taiwan | 1 |
| United Arab Emirates | 1 |
| Total | 2,908 |

A Soyuz booster rocket carrying US and Russian astronauts blasts off for the international space station from the Baikonur Cosmodrome, Kazakhstan, on April 26, 2003.

Military Space Lore



Military Space Firsts

March 22, 1946

First US rocket to leave Earth's atmosphere, JPL-Ordnance WAC reaches 50-mile height after launch from White Sands Proving Ground, N.M.

Feb. 24, 1949

Bumper-WAC Corporal two-stage rocket, first with fully tanked second stage, reaches record altitude of 244 miles and velocity of 5,150 mph.

July 24, 1950

Bumper No. 8 becomes first missile launched from Cape Canaveral, Fla.

Sept. 20, 1956

US Jupiter C rocket, part of the Army's 1954 Project Orbiter, achieves record first flight, reaching altitude of 682 miles and landing 3,400 miles from Cape Canaveral.

Oct. 4, 1957

USSR launches Sputnik 1, first man-made satellite, into Earth orbit.

Dec. 17

USAF Atlas ICBM makes first successful test flight.

Jan. 31, 1958

US launches first satellite, Explorer 1.

Dec. 18, 1958

Project Score spacecraft conducts first US active communication from space.

Aug. 7, 1959

Explorer 6 spacecraft transmits first television pictures from space.

April 1, 1960

TIROS 1 is first US weather satellite to go aloft.

April 13

Transit 1B becomes first US navigation satellite in space.

May 24

MIDAS II is first early warning satellite in orbit.

Aug. 19

Capsule containing first satellite photographs of Soviet Union ejected from Discoverer 14 becomes first orbital payload recovered in midair by C-119 Flying Boxcar.

April 12, 1961

Soviet cosmonaut Yuri Gagarin pilots Vostok 1 through nearly one orbit to become first human in space.

May 5

Lt. Cmdr. Alan B. Shepard Jr., aboard Freedom 7 Mercury capsule, becomes first American in space, climbing to 116.5 miles during suborbital flight lasting 15 minutes, 28 seconds.

Feb. 20, 1962

Project Mercury astronaut Lt. Col. John

H. Glenn Jr., aboard Friendship 7 capsule, completes first US manned orbital flight.

July 17

Air Force Capt. Robert M. White earns astronaut wings when he reaches altitude of nearly 60 miles in rocket-powered X-15, first aircraft to be flown to lower edge of space, considered to be 50 miles.

Oct. 17, 1963

Vela Hotel satellite performs first space-based detection of nuclear explosion.

Aug. 14, 1964

First Atlas/Agena D standard launch vehicle successfully fired from Vandenberg.

March 18, 1965

First space walk conducted by Alexei Leonov of Soviet Voskhod 2.

June 4

Gemini 4 astronaut USAF Maj. Edward H. White II performs first American space walk.

Jan. 25, 1967

Soviet Kosmos 139 antisatellite weapon carries out first fractional orbital bombardment system test.

Jan. 27

First deaths in US spacecraft occur in flash fire in Apollo 1 command module, killing astronauts Lt. Cmdr. Roger B. Chaffee and USAF Lt. Cols. Virgil I. Grissom and Edward H. White II.

Oct. 20, 1968

Soviet Kosmos 248 and Kosmos 249 spacecraft carry out first co-orbital antisatellite test.

July 20, 1969

Apollo 11's Neil A. Armstrong is first human to walk on moon.

April 19, 1971

First space station, Salyut 1, goes aloft.

Nov. 2

Titan IIIC launches first Defense Satellite Communications System (DSCS) Phase II satellites into GEO.

Feb. 22, 1978

Atlas booster carries first Global Positioning System (GPS) Block I satellite into orbit.

Dec. 13

Successful launch of two DSCS II satellites puts full four-satellite constellation at users' disposal for first time.

April 12-14, 1981

First orbital flight of space shuttle and first landing from orbit of reusable spacecraft.

Dec. 20, 1982

First Defense Meteorological Satellite Program (DMSP) Block 5D-2 satellite launched.

Sept. 13, 1985

First US antisatellite intercept test destroys Solwind scientific satellite by air-launched weapon.

Oct. 3

Shuttle *Atlantis* performs first launch of pair of DSCS III satellites from space shuttle using Inertial Upper Stage.

Jan. 28, 1986

Space shuttle *Challenger* explodes after liftoff, killing seven astronauts.

Feb. 14, 1989

Launch of first Block II GPS satellite begins operational constellation.

Jan. 17, 1991

What USAF calls "the first space war," Operation Desert Storm, opens with air attacks.

Jan. 13, 1993

USAF Maj. Susan Helms, flying aboard *Endeavour*, becomes first US military woman in space.

July 19

Launch of DSCS Phase III satellite into GEO provides first full five-satellite DSCS III constellation.

Feb. 7, 1994

First Titan IV Centaur booster launches first Milstar Block I satellite into orbit.

March 13

First launch of Taurus booster places two military satellites in orbit.

Feb. 6, 1995

USAF Lt. Col. Eileen M. Collins is first woman to pilot a US spaceship, doing so when *Discovery* and space station Mir perform first US-Russian space rendezvous in 20 years.

May 29, 1998

First transfer of operational military space system to civilian agency occurs when Air Force hands to NOAA control of DMSP spacecraft.

July 23-27, 1999

Air Force Col. Eileen M. Collins becomes first woman to command shuttle mission when *Columbia* (STS-93) places Chandra X-Ray Observatory, world's most powerful X-ray telescope, in orbit.

Nov. 1, 2000

For the first time, a single Delta II rocket, lifting off from Vandenberg, launches two different primary payloads.

**THANKS TO THE USAF, MILLIONS OF
PEOPLE KNOW WHERE THEY STAND.**

From the Department of Defense to the private sector, GPS is viewed as more than amazing technology. It can be a lifesaver. It can also mean the difference between mission success and failure. Soon a new generation system will join the constellation of satellites. GPS III. With more power. Greater accuracy. System integrity. And a simplified ground control architecture. To build GPS III, the Air Force needs a partner with a proven record for building the highest-precision satellites, integrating critical complex systems, and developing quality software. One company passes every test. Lockheed Martin. To provide the GPS of tomorrow, look to the people who got it to where it is today.

LOCKHEED MARTIN
We never forget who we're working for™



Aerospace. A physical region made up of Earth's atmosphere and the space beyond.

Aerospace plane. A reusable spacecraft able to operate effectively in both the atmosphere and space. Also known as a "transatmospheric vehicle" or, more currently, "spaceplane."

Apogee. The point of greatest distance from Earth (or the Moon, a planet, etc.) achieved by a body in elliptical orbit. Usually expressed as distance from Earth's surface.

Atmosphere. Earth's enveloping sphere of air.

Boost phase. Powered flight of a ballistic missile—i.e., before the rocket burns out.

Burn. The process in which rocket engines consume fuel or other propellant.

Circumterrestrial space. "Inner space" or the atmospheric region that extends from 60 miles to about 50,000 miles from Earth's surface.

Constellation. A formation of satellites orbiting for a specific combined purpose.

Deep space. All space beyond the Earth-Moon system, or from about 480,000 miles altitude outward.

Eccentric orbit. An extremely elongated elliptical orbit.

Ecliptic plane. The plane defined by the circle on the celestial sphere traced by the path of the sun.

Elliptical orbit. Any noncircular, closed spaceflight path.

Exosphere. The upper limits of Earth's atmosphere, ranging from about 300 miles altitude to about 2,000 miles altitude.

Expendable Launch Vehicle (ELV). A launch vehicle that cannot be reused after one flight.

Ferret. A satellite whose primary function is to gather electronic intelligence, such as microwave, radar, radio, and voice emissions.

Geostationary Earth orbit. A geosynchronous orbit with 0° inclination in which the spacecraft circles Earth 22,300 miles above the equator and appears from Earth to be standing still.

Geosynchronous Earth Orbit (GEO). An orbit at 22,300 miles that is synchronized with Earth's rotation. If a satellite in GEO is not at 0° inclination, its ground path describes a figure eight as it travels around Earth.

Geosynchronous Transfer Orbit (GTO). An orbit that originates with the parking orbit and then reaches apogee at the GEO.

Ground track. An imaginary line on Earth's surface that traces the course of another imaginary line between Earth's center and an orbiting satellite.

High Earth Orbit (HEO). Flight path above geosynchronous altitude (22,300 to 60,000 miles from Earth's surface).

High-resolution imagery. Detailed representations of actual objects that satellites produce electronically or optically on displays, film, or other visual devices.

Inertial Upper Stage (IUS). A two-stage solid-rocket motor used to propel heavy satellites into mission orbit.

Ionosphere. A region of electrically charged thin air layers that begins about 30 miles above Earth's atmosphere.

Low Earth Orbit (LEO). Flight path between Earth's atmosphere and the bottom of the Van Allen belts, i.e., from about 60 to 300 miles altitude.

Magnetosphere. A region dominated by Earth's magnetic field, which traps charged particles, including those in the Van Allen belts. It begins in the upper atmosphere, where it overlaps the ionosphere, and extends several thousand miles farther into space.

Medium Earth Orbit (MEO). Flight path between LEO, which ends at about 300 miles altitude, and GEO, which is at an average altitude of 22,300 miles.

Mesosphere. A region of the atmosphere about 30 to 50 miles above Earth's surface.

Orbital decay. A condition in which spacecraft lose orbital altitude and orbital energy because of aerodynamic drag and other physical forces.

Orbital inclination. Angle of flight path in space relative to the equator of a planetary body. Equatorial paths are 0° for flights headed east, 180° for those headed west.

Outer space. Space that extends from about 50,000 miles above Earth's surface to a distance of about 480,000 miles.

Parking orbit. Flight path in which spacecraft go into LEO, circle the globe in a waiting posture, and then transfer payload to a final, higher orbit.

Payload. Any spacecraft's crew or cargo; the mission element supported by the spacecraft.

Perigee. The point of minimum altitude above Earth (or the Moon, a planet, etc.) maintained by a body in elliptical orbit.

Period. The amount of time a spacecraft requires to go through one complete orbit.

Polar orbit. Earth orbit with a 90° inclination. Spacecraft on this path could pass over every spot on Earth as Earth rotates under the satellite's orbit (see orbital inclination).

Remote imaging. Images of Earth generated from a spacecraft that provide data for mapping, construction, agriculture, oil and gas exploration, news media services, and the like.

Reusable Launch Vehicle (RLV). A launch vehicle that can be reused after flight.

Rocket. An aerospace vehicle that carries its own fuel and oxidizer and can operate outside Earth's atmosphere.

Semisynchronous orbit. An orbit set at an altitude of 12,834 miles. Satellites in this orbit revolve around Earth in exactly 12 hours.

Single-Stage-To-Orbit (SSTO) system. A reusable single-stage rocket that can take off and land repeatedly and is able to boost payloads into orbit.

Stratosphere. That section of atmosphere about 10 to 30 miles above Earth's surface.

Sun synchronous orbit. An orbit inclined about 98° to the equator and at LEO altitude. At this inclination and altitude, a satellite's orbital plane always maintains the same relative orientation to the sun.

Thermosphere. The thin atmosphere about 50 to 300 miles above Earth's surface. It experiences dramatically increased levels of heat compared to the lower layers.

Transfer. Any maneuver that changes a spacecraft orbit.

Transponder. A radar or radio set that, upon receiving a designated signal, emits a radio signal of its own.

Troposphere. The region of the atmosphere from Earth's surface to about 10 miles above the equator and five miles above the poles. This is where most clouds, wind, rain, and other weather occurs.

Van Allen belts. Zones of intense radiation trapped in Earth's magnetosphere that could damage unshielded spacecraft.

Boyer, Walter. *Beyond the Wild Blue: A History of the United States Air Force, 1947-1997.* New York: St. Martin's Press, 1997.

Burrows, William E. *Deep Black.* New York: Berkley Publishers Group, 1988.

Burrows, William E. *This New Ocean: The Story of the First Space Age.* New York: Random House, 1998.

Canan, James W. *War in Space.* New York: Harper & Row, 1982.

Collins, John M. *Military Space Forces.* Washington, D.C.: Pergamon-Brassey's, 1989.

Day, Dwayne A., John M. Logsdon, and Brian Latell, eds. *Eye in the Sky: The Story of the Corona Spy Satellites.* Washington, D.C.: Smithsonian Institution Press, 1998.

Department of Defense Space Technology Guide, FY 2000-01. Office of the Secretary of Defense, 2001 (on Web at www.c3i.osd.mil/org/c3is/spacesys/index.html).

Dickson, Paul. *Sputnik: The Shock of the Century.* New York: Walker & Co., 2002.

Gonzales, Daniel. *The Changing Role of the US Military in Space.* Santa Monica Calif., RAND, 1999.

Goure, Daniel, and Christopher M. Szara. *Air and Space Power in the New Millennium.* Washington, D.C.: CSIS Press, 1997.

Hall, R. Cargill, and Jacob Neufeld, eds. *The US Air Force in Space: 1945 to the 21st Century: Proceedings, Air Force Historical Foundation Symposium.* Washington, D.C.: USAF History and Museums Program, 1998.

Hayes, Peter. *Space Power Interests.* Boulder, Colo.: Westview Press, 1996.

Hobbs, David. *Space Warfare.* Old Tappan, N.J.: Prentice-Hall, 1986.

Khalilzad, Zalmay, and Jeremy Shapiro, eds. *Strategic Appraisal: United States Air and Space Power in the 21st Century.* Santa Monica, Calif., RAND, 2002.

Lambakis, Steven. *On the Edge of Earth: The Future of American Space Power.* Lexington, Ky.: University Press of Kentucky, 2001.

Lambeth, Benjamin S. *Mastering the Ultimate High Ground: Next Steps in the Military Uses of Space.* Santa Monica, Calif., RAND, 2003 (on Web at www.rand.org/publications/MR/MR/1649/).

Launius, Roger D., and Dennis R. Jenkins. *To Reach the High Frontier: A History of US Launch Vehicles.* Lexington, Ky.: University Press of Kentucky, 2002.

Lovell, Jim, and Jeffrey Kluger. *Lost Moon: The Perilous Voyage of Apollo 13.* Boston: Houghton Mifflin, 1994.

Mantz, Michael R. *The New Sword: A Theory of Space Combat Power.* Maxwell AFB, Ala.: Air University Press, 1995.

McDougall, Walter A. *The Heavens and the Earth: A Political History of the Space Age.* Baltimore: Johns Hopkins University Press, 1997.

Mudgway, Douglas J. *Uplink-Downlink: A History of the Deep Space Network, 1957-1997.* Pittsburgh: GPO, 2002.

Muolo, Michael L., Richard A. Hand, Bonnie Houchen, and Lou Larson. *Space Handbook* (two volumes). Maxwell AFB, Ala.: Air University Press, 1993.

Neal, Valerie, Cathleen S. Lewis, and Frank H. Winter. *Spaceflight: A Smithsonian Guide.* New York: Macmillan, 1995.

Newberry, Maj. Robert D., USAF. *Space Doctrine for the Twenty-First Century.* Maxwell AFB, Ala.: Air University Press, 1998.

Oberg, James E. *Space Power Theory.* Washington, D.C.: GPO, 1999 (on Web at www.jamesoberg.com).

Peebles, Curtis. *High Frontier: The US Air Force and the Military Space Program.* Washington, D.C.: GPO, 1997.

Peebles, Curtis. *The Corona Project: America's First Spy Satellites.* Annapolis, Md.: Naval Institute Press, 1997.

Preston, Bob, et al. *Space Weapons, Earth Wars.* Santa Monica, Calif.: RAND, 2002.

Report of the Commission to Assess United States National Security Space Management and Organization. US

Department of Defense, 2001 (on Web at www.defenselink.mil/pubs/space20010111.html).

Richelson, Jeffrey T. *America's Secret Eyes in Space.* New York: Harper & Row, 1990.

Richelson, Jeffrey T. *America's Space Sentinels: DSP Satellites and National Security.* Lawrence, Kan.: University of Kansas Press, 1999.

Rip, Michael Russell, and James M. Hasik. *The Precision Revolution: GPS and the Future of Aerial Warfare.* Annapolis, Md.: Naval Institute Press, 2002.

Sellers, Jerry Jon. *Understanding Space: An Introduction to Astronautics.* New York: McGraw Hill, 1994.

Shultz, Richard H. Jr., and Robert L. Pfaltzgraff Jr., eds. *Space: A New Strategic Frontier, The Future of Airpower in the Aftermath of the Gulf War.* Maxwell AFB, Ala.: Air University Press, 1992.

Smith, Marcia S. *Space Activities of the United States, CIS, and Other Launching Countries/Organizations: 1957-1993.* Washington, D.C.: Congressional Research Service, 1994.

Smith, Marcia S. *US Space Programs.* Washington, D.C.: Congressional Research Service, 1993.

Spires, David N., et al. *Beyond Horizons: A Half Century of Air Force Space Leadership.* Maxwell AFB, Ala.: Air University Press, 1998.

Wolfe, Tom. *The Right Stuff.* New York: Bantam Books, 1980.



Astronaut Virgil Grissom converses with astronaut John Glenn just before Grissom's mission in the Liberty Bell 7 capsule. The 1961 mission, dubbed M-4, would be the second manned suborbital flight using the Mercury-Redstone booster rocket. The capsule sank on landing but was recovered in 1999.

AFA Field Contacts



Central East Region

Region President

Thomas G. Shepherd
HCR 61, Box 167, Timber Ridge Rd., Capon Bridge, WV
26711 (304) 856-3868

State Contact

DELAWARE: Richard B. Bundy, 39 Pin Oak Dr., Dover, DE
19904 (302) 730-1459.
DISTRICT OF COLUMBIA: Rosemary Pacenta, 1501 Lee
Hwy., Arlington, VA 22209-1198 (703) 247-5820.
MARYLAND: Andrew Veronis, 119 Bond Dr., Annapolis, MD
21403-4905 (410) 455-3549.
VIRGINIA: Mason Botts, 6513 Castine Ln., Springfield, VA
22150-4277 (703) 284-4444.
WEST VIRGINIA: John R. Pfalzgraf, 1906 Foley Ave.,
Parkersburg, WV 26104-2110 (304) 485-4105.

Far West Region

Region President

Michael J. Peters
5800 Lone Star Oaks Ct., Auburn, CA 95602-9280
(916) 379-3842

State Contact

CALIFORNIA: John F. Wickman, 1541 Martingale Ct.,
Carlsbad, CA 92009 (760) 476-9807.
HAWAII: Jack DeTour, 98-1108 Maluua St., Aiea, HI
96701-2819 (808) 487-2842.

Florida Region

Region President

Bruce E. Marshall
9 Bayshore Dr., Shalimar, FL 32579-2116 (850) 651-8155

State Contact

FLORIDA: Bruce E. Marshall, 9 Bayshore Dr., Shalimar, FL
32579-2116 (850) 651-8155.

Great Lakes Region

Region President

James E. Fultz
3915 Bay Tree Ln., Bloomington, IN 47401-9754
(812) 333-8920

State Contact

INDIANA: William R. Grider, 4335 S. County Rd., Kokomo, IN
46902 (765) 455-1971.
KENTUCKY: Edward W. Tonini, 12 Eastover Ct., Louisville,
KY 40206-2705 (502) 897-0596.
MICHIGAN: Billie Thompson, 488 Pine Meadows Ln., Apt.
26, Alpena, MI 49707-1368 (989) 354-8765.
OHIO: Daniel E. Kelleher, 4141 Colonel Glenn Hwy., #155,
Beavercreek, OH 45431 (937) 427-8406.

Midwest Region

Region President

Keith N. Sawyer
813 West Lakeshore Dr., O'Fallon, IL 62269-1216
(618) 632-2859

State Contact

ILLINOIS: Frank Gustine, 988 Northwood Dr., Galesburg, IL
61401 (309) 343-7349.
IOWA: Marvin Tooman, 108 Westridge Dr., West Des
Moines, IA 50265 (515) 490-4107.
KANSAS: Samuel M. Gardner, 1708 Prairie Park Ln., Garden
City, KS 67846-4732 (620) 275-4555.
MISSOURI: Judy Church, 8540 Westgate, Lenexa, KS 66215-
4515 (913) 541-1130.
NEBRASKA: Bill Ernst, 410 Greenbriar Ct., Bellevue, NE
68005 (402) 292-1205.

New England Region

Region President

David T. Buckwalter
30 Johnnycake Ln., Portsmouth, RI 02871 (401) 841-6432

State Contact

CONNECTICUT: Wayne Ferris, P.O. Box 523, East Granby, CT
06026 (860) 292-2560.
MAINE: David T. Buckwalter, 30 Johnnycake Ln.,
Portsmouth, RI 02871 (401) 841-6432.
MASSACHUSETTS: Donald B. Warmuth, 136 Rice Ave.,
Northborough, MA 01532 (508) 393-2193.
NEW HAMPSHIRE: Eric P. Taylor, 17 Foxglove Ct., Nashua,
NH 03062 (603) 883-6573.
RHODE ISLAND: Wayne Mrozinski, 90 Scenic Dr., West
Warwick, RI 02893-2369 (401) 841-6432.
VERMONT: Dick Strifert, 4099 McDowell Rd., Danville, VT
05828 (802) 338-3127.

North Central Region

Region President

James M. Crawford
1720 9th St. S.W., Minot, ND 58701-6219 (701) 839-7268

State Contact

MINNESOTA: Richard Giesler, 16046 Farm to Market Rd.,
Sturgeon Lake, MN 55783-9725 (218) 658-4507.
MONTANA: Al Garver, 203 Tam O'Shanter Rd., Billings, MT
59105 (406) 252-1776.
NORTH DAKOTA: Robert P. Talley, 921 1st St. N.W., Minot,
ND 58703-2355 (701) 723-6116.
SOUTH DAKOTA: Ronald W. Mielke, 4833 Sunflower Trail,
Sioux Falls, SD 57108 (605) 339-1023.
WISCONSIN: Henry C. Syring, 5845 Foothill Dr., Racine, WI
53403-9716 (414) 482-5374.

Northeast Region

Region President

Raymond "Bud" Hamman
9439 Outlook Ave., Philadelphia, PA 19114 (215) 677-0957

State Contact

NEW JERSEY: Robert Nunamann, 73 Phillips Rd.,
Branchville, NJ 07826 (973) 334-7800, ext. 520.
NEW YORK: Timothy G. Vaughan, 7198 Woodmore Ct.,
Lockport, NY 14094 (716) 236-2429.
PENNSYLVANIA: Ed Gagliardi, 151 W. Vine St.,
Shiremanstown, PA 17011-6347 (717) 763-0088.

Northwest Region

Region President

Steven R. Lundgren
4581 Drake St., Fairbanks, AK 99709 (907) 451-4646

State Contact

ALASKA: Bart LeBon, P.O. Box 73880, Fairbanks, AK 99707
(907) 452-1751.
IDAHO: Donald Walbrecht, 1915 Bel Air Ct., Mountain Home,
ID 83647 (208) 587-2266.
OREGON: Greg Leist, P.O. Box 83004, Portland, OR 97283
(360) 397-4392.
WASHINGTON: Tom Hansen, 97-D Chinook Ln., Steilacoom,
WA 98388-1401 (253) 380-5261.

Rocky Mountain Region

Region President

Craig E. Allen
5708 West 4350 South, Hooper, UT 84315 (801) 731-6240

State Contact

COLORADO: Chuck Zimkas, 8418 Grand Carriage Grove,
Colorado Springs, CO 80920 (719) 266-6875.
UTAH: Ted Helsten, 1339 East 3955 South, Salt Lake City,
UT 84124-1426 (801) 277-9040.
WYOMING: Stephan Pappas, 2617 E. Lincolnway, Ste. A,
Cheyenne, WY 82001 (307) 637-5227.

South Central Region

Region President

Peyton Cole
2513 N. Waverly Dr., Bossier City, LA 71111
(318) 742-8071

State Contact

ALABAMA: Greg Schumann, 4603 Colewood Cir., Huntsville,
AL 35802 (256) 337-7185.
ARKANSAS: Jerry Reichenbach, 501 Brewer St.,
Jacksonville, AR 72076-4172 (501) 988-3602.
LOUISIANA: Albert L. Yantis Jr., 234 Walnut Ln., Bossier
City, LA 71111-5129 (318) 746-3223.
MISSISSIPPI: Leonard R. Vernamonti, 1860 McRaven Rd.
Clinton, MS 39056-9311 (601) 925-5532.
TENNESSEE: James C. Kasperbauer, 2576 Tigrett Cove,
Memphis, TN 38119-7819 (901) 685-2700.

Southeast Region

Region President

Rodgers K. Greenawalt
2420 Clematis Trail, Sumter, SC 29150 (803) 469-4945

State Contact

GEORGIA: Mike Bolton, 1521 Whitfield Park Cir., Savannah,
GA 31406 (912) 966-8295.
NORTH CAROLINA: William D. Duncan, 11 Brooks Cove,
Candler, NC 28715 (828) 667-8846.
SOUTH CAROLINA: David T. Hanson, 450 Mallard Dr.,
Sumter, SC 29150 (803) 469-6110.

Southwest Region

Region President

William A. Lafferty Jr.
2167 S. Via Alonso, Green Valley, AZ 85614
(520) 625-9449

State Contact

ARIZONA: Arthur W. Gigax, 3325 S. Elm St., Tempe, AZ
85282-5765 (480) 838-2278.
NEVADA: Robert J. Herculson, 1810 Nuevo Rd., Henderson,
NV 89014-5120 (702) 458-4173.
NEW MEXICO: Peter D. Robinson, 1804 Llano Ct. N.W.,
Albuquerque, NM 87107 (505) 343-0526.

Texoma Region

Region President

Michael G. Cooper
1815 Country Club Dr., Enid, OK 73703 (580) 233-5411

State Contact

OKLAHOMA: George Pankonin, 2421 Mount Vernon Rd.,
Enid, OK 73703-1356 (580) 234-1222.
TEXAS: Dennis Matthis, P.O. Box 8244, Greenville, TX 75404-
8244 (903) 455-8170.

Special Assistant Europe

Special Assistant

Denny Mauldin
PSC 2, Box 9203, APO AE 09012 011-49-631-52031

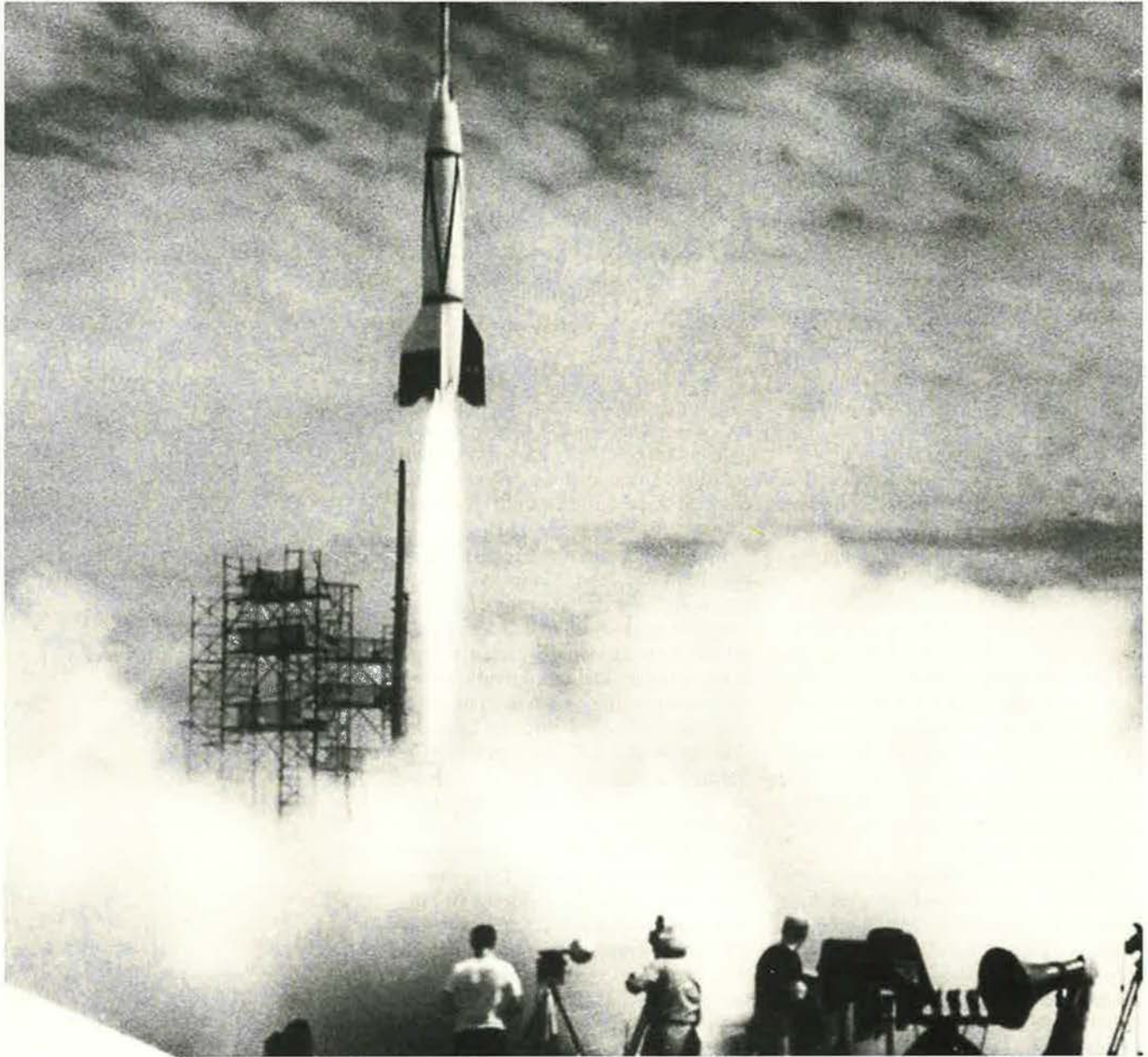
Special Assistant Pacific

Special Assistant

Gary L. McClain
Komazawa Garden House D-309, 1-2-33 Komazawa
Setagaya-ku, Tokyo 154-0012, Japan 81-3-3405-1512

For information on the Air Force Association, see www.afa.org

Beginnings



NASA photo

Bumper-WAC Corporal was America's first large two-stage rocket. It was a German V-2 topped with a US Army Corporal missile. Eight such Bumper-WACs were assembled. The first launch took place on May 13, 1948, at White Sands Proving Ground, N.M. The hybrid system attained only slightly more speed and altitude than a V-2, but on Feb. 24, 1949, a Bumper-WAC set

records for a man-made object, reaching 5,150 mph and an altitude of 244 miles. Bumper-WAC operations moved the following year to the fledgling test grounds at Cape Canaveral, Fla. The project ended in July 1950, having taught scientists much about rocket motor ignition at high altitudes, separation of stages, and increases in rocket speed in stages.

How can the Air Force keep funding two major mission areas—air and space?

FOOTING THE FOR MILITARY

By Benjamin S. Lambeth

OF ALL the uncertainties that currently affect the Air Force's prospects for realizing the near-term promise of military space, none is more crucial than the basic question of how—and at what opportunity cost—those prospects will be financed.

Under current arrangements, USAF has increasingly come to shoulder the burden of funding what are, in effect, *two* major military mission areas—air *and* space—with an annual budget share intended for only one. Although all of the services benefit from the space product ultimately provided, military space funding comes almost entirely out of the Air Force's budget.

One reason the other services have so readily acquiesced in the Air Force's long-standing dominance of military space is that USAF's provision of virtually the entire military space product essentially has allowed them a free ride. It should scarcely be surprising that the other services would have such voracious appetites for space support when they do not have to pay for such costly benefits themselves.

For its part, however, the Air Force has become increasingly hard pressed to uphold both air *and* space responsibilities with a constant one-third share of overall annual US defense

spending. Meanwhile, demands for space support and space force enhancement by all services have grown steadily since military space first came of age during Operation Desert Storm.

Recognizing this growing Air Force predicament, the Congressionally mandated Space Commission concluded in January 2001 that America's military space capabilities are "not funded at a level commensurate with their relative importance." The commissioners voiced special concern that the Army and the Navy are the defense community's largest users of space products and capabilities, but the budget activities of those two services "consistently fail to reflect the importance of space." This pointed up a "dichotomy between the importance of space to the Army and the Navy [and] the funding commitment these services make" which "needs to be addressed."

The commissioners appeared to be saying between the lines that the other services are not bearing their fair share of the funding burden for the space-related services provided to them. Specific areas noted by the commissioners as underfunded included space situational awareness, enhanced protection and defensive measures for on-orbit assets, modernized launch, and the science and

BILL SPACE

technology program, featuring space based radar, space based laser, hyperspectral sensors, and reusable launch technology.

Weight and Cost

An aggravating factor is that space applications have become increasingly expensive as the US defense establishment has become increasingly dependent on them. One seemingly intractable cause has been the high cost of space launch, which has imposed a limit on the rate at which the US can expand its military assets on orbit. The constant-dollar price of getting a satellite to low Earth orbit has not changed much over the past two decades. The cost per pound to LEO for most commercial satellites now on orbit ranges between \$3,600 and \$4,900, depending on the altitude and character of the orbit. The cost per pound for getting a payload all the way out to geostationary Earth orbit is considerably higher—\$9,200 to \$11,200.

Furthermore, the prospect for any substantial diminution in launch costs over the next 10 to 15 years remains dim because of the unalterable physics of chemically fueled, rocket-based launch. There is little near-term technology offering any promise of circumventing this problem.

One mitigating factor is miniatur-

ization. It has slowly but inexorably increased the functionality of each payload pound on orbit, making possible the development and launching of smaller satellites. A decade ago, military satellites typically weighed between 5,000 and 20,000 pounds. Now those going to LEO usually weigh between 500 and 2,000 pounds. This means that the cost-per-pound issue may turn out to be less pressing in the future.

Further compounding the continued high cost of space launch is another factor. The Air Force is facing an acquisition challenge of the first order due to the block obsolescence of many on-orbit systems now in service and the emergence of a new generation of replacements. Virtually every major US military space system is due for an upgrade or replacement over the coming decade, at an estimated cost of some \$60 billion. These include the Global Positioning System satellites, all military communications satellites, and the Defense Support Program constellation of missile-launch sensors.

There also is the looming prospect of space capabilities coming within the grasp of adversaries who would threaten some US satellite functions. That stimulates a need for expenditures on defensive and counteroffensive space control measures.

The potential of new capabilities such as space based radar, laser communications, and hyperspectral sensing, all of which can significantly enhance overall terrestrial force effectiveness, also compound the funding problem.

These technology opportunities have arisen at a time when the Air Force is facing an unprecedentedly costly task of replenishing its deployed *air* assets, including not only new fighters such as the F/A-22 and F-35 but also new tankers, airlifters, and intelligence-surveillance-reconnaissance platforms. All of these procurement needs are competing for shares of the Air Force budget.

Zero-Sum Game?

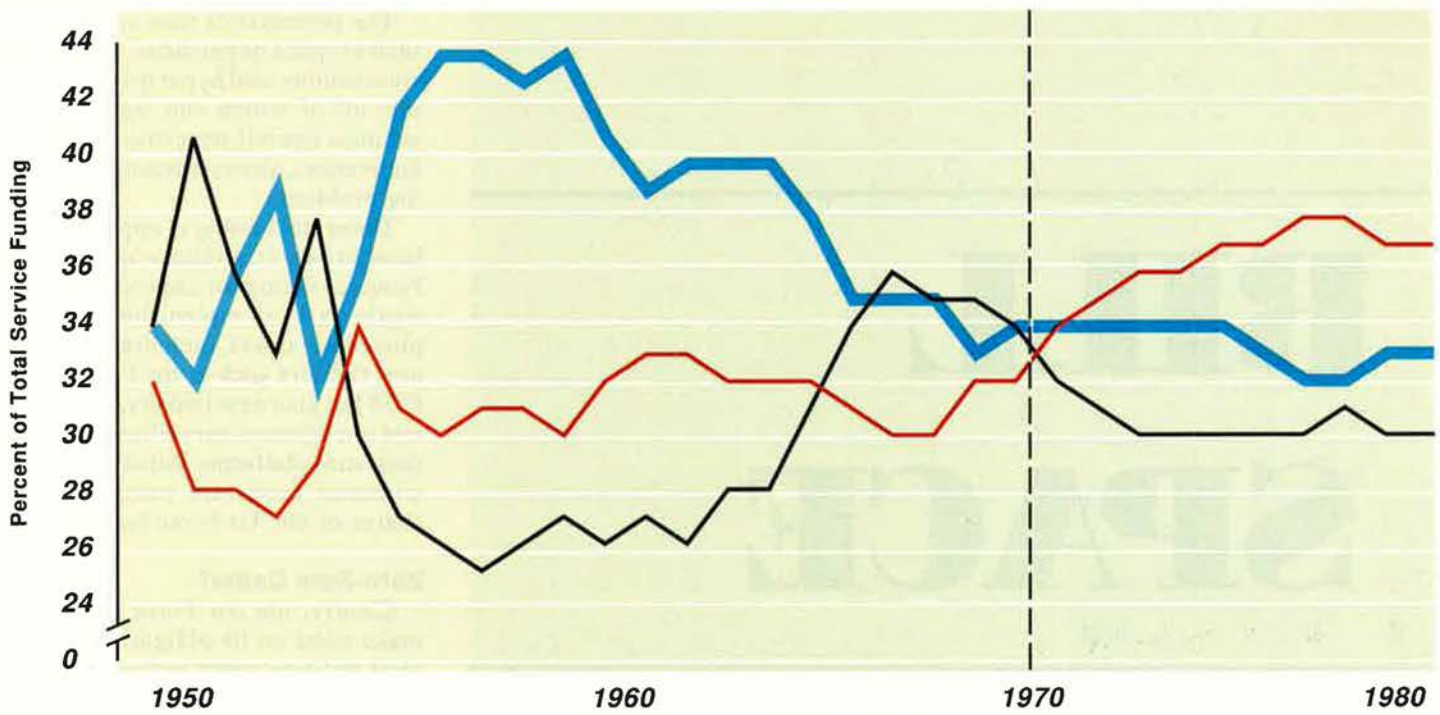
Clearly, the Air Force can never make good on its obligations to exploit military space unless it begins sinking more money into that effort. Yet the nation's space priorities must not blot out equally vital *air*-related mission needs. Not even the service's most senior space leaders would argue that the Air Force can afford to abandon its existing core air mission responsibilities simply to free up more money for space.

At present, there is a zero-sum competition going on between military space priorities and other USAF spending requirements, including its force-projection needs. Should the Department of Defense continue its current resource apportionment practices with respect to space, the Air Force will, in the words of one former senior space officer, find itself faced with "the untenable option of capitalizing space with its increasingly limited resources."

As one serving space officer declared, "Today's zero-sum budget environment does not provide enough money for organizations to support both their core competencies and other essential, though ancillary, functions. ... Under today's configuration, the Air Force is expected to equally prioritize funding opportunities for its own direct warfighting capabilities as well as its own and its customers' [space] support needs."

She added, "These space services represent non-core, non-warfighting services that carry some of our nation's largest must-pay bills."

A core challenge facing the Air Force entails finding an equitable funding arrangement that will under-



No Offset. This chart depicts the services' historical shares of DOD spending (excluding DOD-wide). As can be seen, USAF's share once dwarfed the Army's and Navy's, but it fell and has stayed flat since 1970. Thus, even as USAF absorbed the space mission over the past 30 years, service shares of funding remained essentially unchanged.

write the nation's military space needs in the interest of all services without doing so at the expense of the service's Title 10-mandated air responsibilities. All signs are that space funding needs to be drawn from the US defense budget as a whole, not just from the Air Force's more limited R&D and procurement allocations. Contributions could come from funding now devoted to Army helicopters, Navy and Marine aviation, submarines, surface ships, tanks, howitzers, and all other military R&D and procurement programs across the board.

Military space is not just another Air Force service-specific function—like airlift and close air support—that has long served other categories of military operations and other services. Rather, it constitutes a separate and distinct mission arena in its own right, one which promises, over time, to become as costly as the land, maritime, and air arenas are today.

Needed: New Mechanism

To address this challenge, the Space Commission proposed a new approach—creation of a new DOD major force program (MFP) budget category for space. It would cut across service lines with a view to providing a single budget mechanism for space. It would foster greater transparency

in the tracking and management of multiservice space procurement programs.

One advantage of such a budget solution is centralization, which would bring clarity, for the first time, to overall US military space spending. The current method obscures the way the nation's military space money is reported.

As long as US military space funds are provided as they are now—almost entirely within the Air Force's R&D and procurement budgets—officials in the Office of Management and Budget and in Congress will be inclined to continue their familiar and historic "service budget balancing" practices, and the other services will be more than content to go along.

As matters stand, space will only get well at the expense of air programs, unless the overall DOD funding topline for military space is increased or alternate funding arrangements across service lines are implemented.

Who Will Pay?

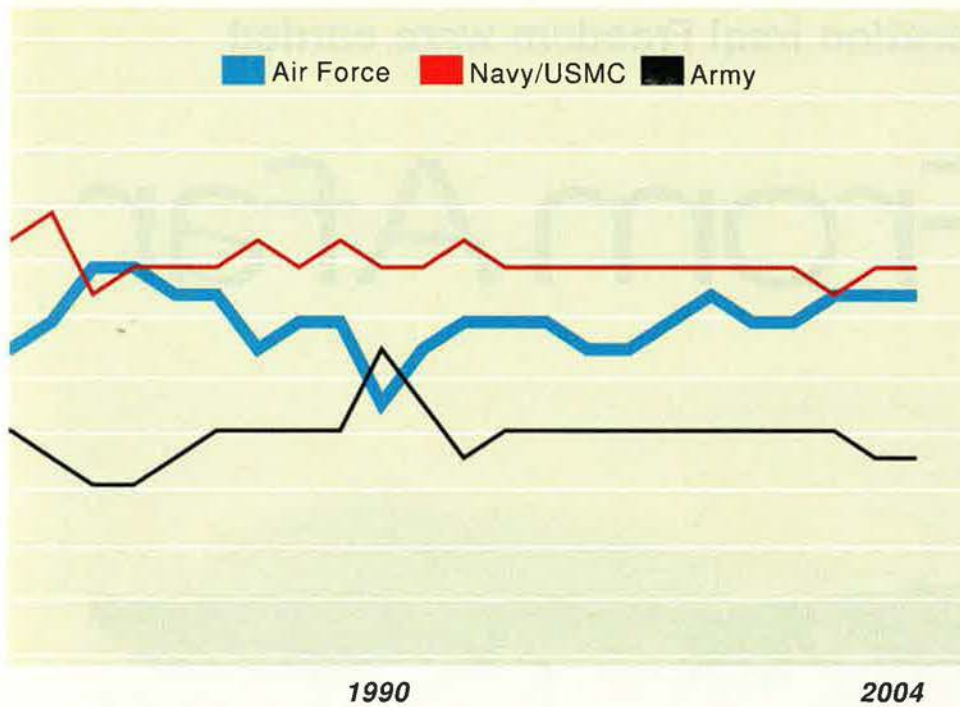
This raises a critical question: If push comes to shove, whose program interests should be forced to suffer to finance an accelerated shift of American military capabilities into space? The four services are incapable of reapportioning the defense budget in

favor of more equitable support to Air Force air and space interests at the expense of competing accounts. This would require the services to set aside their own high-priority interests in the roles and resources arena. Trade-off decisions of that magnitude should be made by the most senior US civilian defense leaders.

It is worth noting that there is nothing preordained or immutable about the way in which the American defense budget is divided. That is strictly a matter of senior civilian leadership choice and Congressional consent. In the late 1950s and early 1960s, the Air Force's share of the overall US defense budget ranged from 40 to 44 percent. (See table above.) It happened because national strategy demanded it.

Until the new space MFP is better defined and more fully institutionalized, the Office of the Secretary of Defense may need to exert greater control of the space requirements of the other services. The Joint Requirements Oversight Council may need to closely adjudicate those requirements. Fiscal reality must be taken into account when DOD is identifying and budgeting for new space needs.

The evolving space MFP mechanism will enable the defense comptroller and other supervising entities to view the entire space funding scene



for the specific purpose of sizing the space-related budget and scrubbing excess service requirements. They can single out and delete those which represent overlap or redundancy or are merely desirable.

Such oversight should put senior officials in all services on notice that everything they ask for in space will, henceforth, entail a trade-off with everything else they ask for in the other MFPs. That provision alone should help bring greater rigor to the space requirements process.

Secretary of Defense Donald H. Rumsfeld ratified space as a separate and distinct military mission area. Now needed is a funding arrangement in which the other services will have to make contributions for their service-specific space ambitions and requirements. Such an arrangement would help ensure that the air operations portion of the Air Force's Title 10 responsibilities can compete on more reasonable terms with the programs of the other services, with the Air Force, as the DOD's designated executive agent

for space, setting the direction of the national military space effort.

With respect to the pivotally important issue of DOD space funds management, OSD last year issued a draft directive authorizing the Air Force to "periodically review the space program, budget, and accounting mechanism," which the directive described as a "virtual" MFP, and to recommend to the DOD comptroller suggested changes to the content of that virtual MFP.

A subsequent DOD report to Congress on the department's implementation of the Space Commission's recommendations expressly defined the virtual MFP as consisting of some 180 program elements grouped into space control, space force application, space force enhancement, space support, and "other space."

More important yet, it identified space program elements not only from the Air Force, but also from the Army, Navy, Defense Information Systems Agency, and Defense Advanced Research Projects Agency. Their aggregation in this new and

unprecedented manner should give the Air Force, as the designated space executive agent, an unprecedented ability to identify cross-service program overlap and redundancies.

Title 10 Authority

The Space Commission recommended asking Congress to amend Title 10 of the US Code to give the Air Force statutory authority over the space as well as air mission area. On reflection, OSD chose not to follow up on that recommendation out of concern over the legal Pandora's box it might open. As a result, the air mission area is now assigned to the Air Force by Title 10, but the space mission is assigned by executive authority.

Nevertheless, the Air Force's space executive-agent role has a Title 10 context, even if it lacks Title 10 authority. Conversely, the planned MFP for space has a Title 10 flavor though it is set in an executive-agent context.

Although the new arrangement will be insufficient, in and of itself, to relieve the Air Force of its current budget problem, it may offer initial building blocks for constructing a better solution.

Ultimately, if US military space exploitation is to be properly funded without compromising the Air Force's continuing Title 10 air responsibilities, DOD will need to settle on a more equitable arrangement. "Fee for service," one option sometimes suggested, is, by most expert opinion, not the right answer for multiple reasons. That said, this issue warrants creative examination by the Air Force and by OSD's concerned principals, along with determined and energetic action by both, as appropriate, to realize the full promise of the pending space MFP.

On this point, a note of guarded optimism recently was sounded by the designated executive agent for space, Undersecretary of the Air Force Peter B. Teets. He spoke of a new "receptivity to change" among senior Pentagon leaders and the establishment of "an environment where, perhaps, additional resources can be brought to bear to achieve some great objectives." ■

Benjamin S. Lambeth is a senior staff member at RAND. He is the author of The Transformation of American Air Power (2000) and NATO's Air War for Kosovo (2001). This article was extracted from his just-published RAND report "Mastering the Ultimate High Ground" (RAND, 2003), written as a contribution to a larger RAND Project Air Force effort, entitled "Thinking Strategically About Space," for the US Air Force. Lambeth's most recent article for Air Force Magazine "Task Force Hawk," appeared in the February 2002 issue.

Important parts of Operation Iraqi Freedom were carried out by remote control.

War From Afar

By Richard J. Newman

IN THE first week of Gulf War II, a Marine reconnaissance team near Basra reported it was surrounded by enemy troops and in need of reinforcements. The quickest way in was by helicopter, but the nearby terrain was unfamiliar.

Out went an urgent request for U-2 and Predator surveillance aircraft to scout possible landing zones.

Five thousand miles away, at Langley AFB, Va., USAF Capt. Bob Lyons turned to the task. He and dozens of his colleagues had been set up in 27 chilly trailers lashed together to form a distributed ground station (DGS), which monitored minute details of the war. Lyons started redirecting a U-2 that was already airborne over Iraq. The U-2 got onto the scene and snapped its first pictures a mere 20 minutes after the original call for help.

Intelligence experts at Langley and another base (unnamed here, at Air Force request) quickly analyzed the photos and then transmitted them via satellite to the combined air operations center (CAOC) in Saudi Arabia. There, US planners reviewed the images and began to designate landing zones and prepare for the mission.

A few minutes later, Lyons helped direct a Predator unmanned aerial vehicle to the scene of the action. Specialists looking through the UAV's camera located the Marines and scanned the ground for signs of any Iraqi activity near the potential landing zones. The UAV relayed real-time video to Langley, the CAOC, and several other posts.

The long-distance linkup paid off: Two hours after the first Marine SOS,



USAF photo by MSgt. Deb Smith

War Stars. The electronic "take" from Predators and other UAVs was monitored by intelligence experts and others at US bases. Here, a crew at Tallil AB, Iraq, move a Predator into position.

reinforcements were on their way to the LZs.

Virtual Warriors

Hollywood has long portrayed the American military as all-knowing and capable of spellbinding technological feats. As the troops know, reality is often far less impressive.

However, more than ever before, the front-line troops in Iraq relied on high-tech virtual warriors operating nowhere near the war zone. Hundreds of troops who typically would have deployed to the theater stayed at their home bases in the United States and elsewhere, contributing to the success of the armed action through satellite and computer links, all without adding to the US footprint in the region.

At Langley, the Air Force tasked an entire 1,700-person intelligence group

to provide direct, real-time support to US Central Command's intelligence directorate, just as if they were at the CAOC. Other remote-control warriors helped direct U-2s and control Predators as well as the sensors onboard.

Leaving some troops at home yields a clear logistical benefit. "This equip-

ment and manpower does not have to move forward,” said Brig. Gen. Kelvin R. Coppock, director of intelligence for Air Combat Command at Langley. That, in turn, reduces the amount of lift, lodging, food, and security forces needed to support troops in the theater.

Decentralizing the network of intelligence support also appears to have helped significantly compress the “kill chain”—that is, shorten the amount of time needed to progress from target detection to target destruction. In Gulf War II, the average amount of time needed to complete the cycle was about 45 minutes—half what was required in the war in Afghanistan only two years ago. And Afghanistan marked a dramatic improvement over the first Persian Gulf War in 1991, when it often took hours or days for targeting data to travel from sensor to shooter.

The Iraq war required significant contributions from about one dozen bases located beyond the theater. Langley was one of the busiest hubs of extra-theater activity. The 27-trailer DGS served as a Stateside nerve center for air war intelligence operations. Inside the warren of trailers, Air Force intelligence experts monitored radio traffic and live video feeds from Predators. Maps of Iraq and downtown Baghdad hung on the walls.

Analysts working 12-hour shifts downloaded and transmitted hundreds of images each day. Other experts regularly re-evaluated the intelligence-



USAF photo by SSgt. Lee A. Osberry Jr.

Burn and Bang. In one case, a Predator operator in the US used the laser of a UAV to heat up an Iraqi target, which was then hit by an A-10 Warthog (such as this one) with a laser guided bomb.

surveillance-reconnaissance component of the daily air tasking order to make sure the US was getting the maximum benefit out of available assets.

During each day of combat operations, troops at the DGS helped planners in Saudi Arabia handle about 50 time sensitive targets—fleeting targets like convoys of Iraqi troops or mobile surface-to-air missiles mounted on the backs of trucks.

After spotting such a target, officials at the CAOC typically would contact Langley and ask specialists to punch raw intelligence into a program called ISR Manager. The soft-

ware tracked all ISR flights and associated targets and could determine which intelligence asset would be able to get to the new target area most quickly and what other intelligence might be lost in the process.

Such rapid processing by computers is often the only way to gather adequate targeting data on fleeting targets before they disappear, yet it doesn't always make sense to drop everything for an uncertain strike opportunity.

“There's no point pulling a higher priority target for a lower one,” explained Maj. Larry Mastin, who's helping develop the system's future capabilities at Langley.

While officials still consider the Langley program to be a prototype, they note that, in numerous cases, it helped generate intelligence about targets that might otherwise have vanished before they could be attacked.

Something Different

At other times, the quick turnaround time came as a result of months of practice.

Example: SSgt. Brandy Hudson, an imagery analyst, never left Langley. She belonged to a special “airfield assessment team” formed by CENTCOM in December 2002. As part of the team, she spent the weeks preceding the war poring over intelligence relating to Iraqi airfields, the better to move swiftly once the shooting started. Then the war be-

USAF photo



A Long Tether. Most of the USAF unit that operates the high-flying Global Hawk UAV never left home for Iraqi Freedom. All but a few stayed at US bases, carrying out the operation and analyzing images.

gan. One day, as she scanned a series of images of Iraqi airfields, something leaped out at her. She noticed that the picture contained a structure that had not been on the picture taken five hours earlier. Sure enough, the new item was an Iraqi surface-to-air missile.

Hudson annotated the site and sent her analysis to the theater only about 30 minutes after first seeing the image, and the SAM was destroyed a short while afterward.

The Air Force designed the DGS to be deployable. However, it does not travel. (There are actually two—one at Langley and one on the West Coast.) Moving 27 trailers and all the support gear would take up all of the room on 17 dedicated C-5 transports—aircraft which are already in heavy demand. Moreover, the Air Force would have to transport the 600 specialists who man the DGS.

Since the Iraq war validated ACC's reachback concept, the Air Force is now planning to build permanent facilities for the DGS at Langley. "I can't think of any reason to have them forward," said Coppock.

Analysis and processing aren't the only functions being shipped to the distant rear. In May 2002, Gen. Hal M. Hornburg, the ACC commander, approved the concept of "remote split operations" for Predator units. Ever since the Predator's debut over Bosnia in 1995, the unmanned surveillance airplanes had been operated by units

that deployed to the theater. Unlike manned aircraft, however, Predators are "flown" by pilots who give signals to the airplane via satellite links. The pilot controlling the UAV can operate from any facility, as long as the UAV has the capability to communicate through a satellite.

Hornburg's approval of the new concept of operations caused a radical change. When it came time to ship several Predators over to Gulf locations, about half of the aircrews stayed at home bases. It didn't limit their role in the war, however.

You Find, I'll Fire

On one occasion, a Predator camera was scanning US Army supply lines in southern Iraq, keeping an eye out for approaching enemy attackers, when it spotted an Iraqi SAM. The Predator was outfitted with its own laser designator, so the UAV pilot—who was sitting in a command center in the western US—heated up the target. Meanwhile, an A-10 attack aircraft was flying nearby. The A-10 pilot, using the Predator's laser targeting, launched a laser guided weapon and destroyed the SAM. It was one of the first times ever that a pilot outside the combat zone had such a direct role in an attack.

In at least one other case, a Predator pilot who was controlling a UAV from US territory fired a Hellfire missile at a target on Iraqi soil—in its way, one of the longest-ranged

strikes ever. Despite the novelty, commanders and war planners seemed quickly comfortable with the setup. "It's not only something that technology has allowed us to do," said Lt. Col. Stewart Kowall, operations officer for the 15th Reconnaissance Squadron at Nellis Air Force Base in Nevada. "We like doing it this way. The only feedback has been positive."

Remote Predator operations produce only modest manpower savings. The airplanes still must be based in the theater, which requires launch-and-recovery teams to handle take-offs and landings. (The airplane is controlled by on-site airmen until it reaches an altitude of about 1,000 feet, at which point the pilot at the remote ground station takes over via satellite linkup.) Maintenance crews that keep the UAVs humming also have to be in theater. Thus, of the 60 troops usually required for one Predator deployment, about two dozen can now stay at home base. With only four Predators deployed to the Iraqi theater, the US footprint shrunk by just 100 or so.

However, there's another gain from centralizing some of the key people for an aircraft as scarce as the Predator. "The real benefit is the flexibility it provides the combatant commander," said Kowall. The single-engine spyplane is so popular that the Joint Chiefs of Staff routinely turn down requests for Predators from the Pentagon's regional four-star commanders. If Predator pilots and analysts don't always have to deploy, it should be easier to "swing" the Predator from one operation to the next. Ground crews would still have to pack up and move, but Predator operators and analysts at home base should be able to switch seamlessly from one operation to another on virtually no notice.

Remote operations also give the troops a break. Predators are in such high demand that their crews have been deploying at rates that are among the highest in the Air Force. When the troops do their job from the home base, said Kowall, "we still consider them deployed." The hours are the same as if they were in the war zone—24/7, usually split into two 12-hour shifts—and the pace of the operation thousands of miles away dictates the schedule. But there are ob-

USAF photo by SSgt. Chris Flathive



To the Front. UAVs still need professional maintenance at either end of the deployment. Here, airmen of the 757th Air Maintenance Expeditionary Squadron prime a Predator to go overseas.



intelligence was notoriously tough to get—the whereabouts of Saddam Hussein and his senior deputies is a good example—there were other occasions in which there was a surfeit of information.

“On many occasions,” said Coppock, “we had the data but no strikers.”

During the encounter with the Iraqi Republican Guard’s Medina Division in late March, for instance, the targeting data flowed in so fast that crowded airspace—not intelligence shortfalls—became the factor that held back the pace of the attack.

Successes of the type seen in Gulf War II should pave the way for even more remote operations. Experiment-

vious differences. “At the end of the duty day,” said Col. Charlie Lyon, commander of the 57th Operations Group at Nellis, “you walk out of the deployment and walk back into the rest of life in America.”

Quiet: Warriors at Work

It is also true, though, that since airmen are much more accessible to their families, commanders have to take steps to prevent broken appliances and school problems and other home issues from disrupting the “battle rhythm.” Personal calls to the control room, for instance, aren’t allowed.

USAF gives high priority to making better use of highly trained UAV specialists such as pilots and imagery analysts. Most of the analysis of U-2 imagery during the Iraq war was handled back in the States, some of it outsourced to reservists.

The unit that operates the high-altitude Global Hawk UAV changed tactics, too. During the war in Afghanistan two years ago, the whole unit deployed to Pakistan. During Gulf War II much of the team stayed home, spending more time doing their core jobs instead of packing and unpacking bags and coping with the often harsh conditions of overseas bases.

Even with better use of the manpower, however, there were shortages. The Global Hawk that flew over Iraq, for instance, was capable of taking thousands of pictures a day, but it only took hundreds, because there weren’t enough analysts



Photo by Paul Kennedy

Joystick Warriors. At top, a Predator flies high above Indian Springs AFAF, Nev. It is controlled by professionals such as these two airmen ensconced in a distant command center.

on the ground to sort through any more than that.

The experience of Gulf War II seems to have satisfied operators who worried about whether long-distance intelligence support would actually arrive when it was needed. Inadequate intelligence has long been a constraining factor in air campaigns. Often, it’s too slow to arrive or incomplete. Iraq seemed to have signaled a turning point. While some

ers at Langley are developing increasingly sophisticated software and other tools that would automate imagery analysis and other time-consuming tasks, further speeding support from the distant rear. Planners envision a day when the Air Force will be able to run an entire air operations center—and thus a complete air war—from the United States. Hollywood might have trouble keeping up. ■

Richard J. Newman is a former Washington, D.C.-based defense correspondent and senior editor for US News & World Report. He is now based in the New York office of US News. His most recent article for Air Force Magazine, “The Iraqi File,” appeared in the July issue.

Books

Compiled by Chequita Wood, Editorial Associate

The 356th Fighter Group in World War II: In Action Over Europe With the P-47 and P-51. Kent D. Miller. Schiffer Publishing, Atglen, PA (610-593-1777). 332 pages. \$59.95.



Cheating Death: Combat Air Rescues in Vietnam and Laos. George J. Marrett. Smithsonian Institution Press, Washington, DC (800-782-4612). 225 pages. \$27.95.



Mustang Survivors. Paul Coggan. Specialty Press Publishers and Wholesalers, North Branch, MN (800-895-4585). 174 pages. \$29.95.



All the Way to Berlin: A Paratrooper at War in Europe. James Megellas. Ballantine Books, New York (800-726-0600). 309 pages. \$24.95.

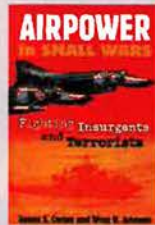


Corporate Warriors: The Rise of the Privatized Military Industry. P.W. Singer. Cornell University Press, Ithaca, NY (607-277-2211). 330 pages. \$39.95.



On the Frontier: Experimental Flight at NASA Dryden. Richard P. Hallion and Michael H. Gorn. Smithsonian Institution Press, Washington, DC (800-782-4612). 554 pages. \$34.95.

Airpower in Small Wars: Fighting Insurgents and Terrorists. James S. Corum and Wray R. Johnson. University Press of Kansas, Lawrence, KS (785-864-4155). 507 pages. \$24.95.



Fire Mission!: The Story of the 213th Field Artillery Battalion in Korea 1951-1954. Anthony J. Sobieski. 1st Books, Bloomington, IN (800-839-8640). 173 pages. \$19.95.



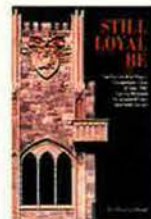
Responsibility of Command: How UN and NATO Commanders Influenced Airpower Over Bosnia. Col. Mark A. Bucknam, USAF. Air University Press, Maxwell AFB, AL (334-953-2773). 407 pages. \$40.00.



Atlas of American Military History. James C. Bradford, ed. Oxford University Press, New York (800-451-7556). 248 pages. \$50.00.



Great Aviators and Epic Flights. Von Hardesty. Hugh Lauter Levin Associates, Westport, CT (203-227-6422). 264 pages. \$40.00.



Still Loyal Be: The Story of West Point's Extraordinary Class of June 1943 Fighting Wars and Performing Military and Public Service. Tom Carhart. Order from: Francis Rundell, 20540 Falcons Landing Cir., Apt. 4404, Sterling, VA 20165 (703-404-9494). 183 pages. \$25.00.

Beyond Glory: Medal of Honor Heroes in Their Own Words. Larry Smith. W.W. Norton & Co., New York (800-233-4830). 404 pages. \$25.95.



History of Rocketry and Astronautics: AAS History Series, Vol. 25. Hervé Moulin and Donald C. Eider, vol. eds. American Astronautical Society, San Diego (760-746-4005). 358 pages. \$60.00.



The Story of The Boeing Company. Bill Yenne. Boeing Stores, Seattle (866-926-3464). 288 pages. \$45.00.



C-130 Hercules: Walk Around No. 31. Lou Drendel. Squadron/Signal Publications, Carrollton, TX (800-527-7427). 80 pages. \$14.95.



Lockheed Martin C-5 Galaxy: WarbirdTech Series Vol. 36. Bill Norton. Specialty Press Publishers and Wholesalers, North Branch, MN (800-895-4585). 104 pages. \$16.95.



Stray Voltage: War in the Information Age. Wayne Michael Hall. Naval Institute Press, Annapolis, MD (800-233-8764). 219 pages. \$36.95.



*DIFFERENT BRANCHES.
DIFFERENT MISSIONS.
DIFFERENT PLATFORMS.
DIFFERENT ENVIRONMENTS.
ONE DOMINANT FORCE.*

In today's battlespace, interoperability and situational awareness require a seamless network solution. Focus and technical leadership place us at the forefront. With an array of key, enabling building blocks to keep forces in the loop. From navigation, communications and avionics systems to advanced display technology. All delivered on time. As promised.

319.295.5100 www.rockwellcollins.com/gs

**Rockwell
Collins**

The Air Force seeks a deal to replace its aged KC-135s with leased commercial tankers.

100 TANKERS

By John A. Tirpak, Executive Editor





The oldest and most problem-prone tankers in the Air Force—KC-135Es such as this one—would be replaced by 2011 with new, commercial tankers leased from Boeing. Younger KC-135Rs could continue in service 20 more years.

THE Air Force, heavily dependent for more than 40 years on workhorse KC-135 tankers, is about to begin a critical renewal effort.

Following years of frustrating delays, the Pentagon finally gave the Air Force a green light to replace the aged air refuelers with state-of-the-art aircraft. Edward C. Aldridge, speaking at his last news briefing as Pentagon acquisition chief, said USAF can lease 100 tankers based on the Boeing 767-200. Boeing would convert these aircraft into KC-767 commercial tanker variants.

Aldridge announced the DOD decision on May 23. Congress must review and approve it before the Air Force can sign a contract.

The tanker modernization program, if it goes forward as planned, would serve as a model for “no-frills” acquisition that could be used to field urgently needed capability quickly. Indeed, the Air Force said the program must succeed if it is to head off what officials warn could be “catastrophes.”

“We cannot continue to fly KC-135s forever,” Aldridge asserted, “and the longer you wait to recapitalize, the more you run the risk ... of a fleet of those aircraft being grounded for some reason.”

The Aldridge announcement capped two years of round-robin negotiation and horse-trading between and among Boeing executives, members of Congress, and Pentagon and Air Force officials. The avowed goal was to

shake hands over a deal that would not only satisfy service requirements but also be affordable.

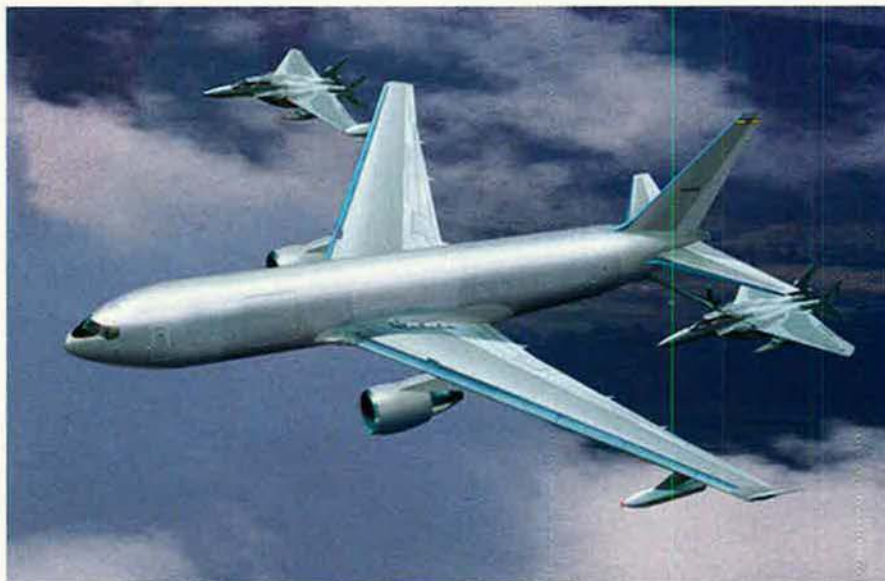
Aldridge declared that the deal in hand will do both.

In brief, USAF would lease the 100 airplanes at a per-airplane cost of \$138.7 million. The Air Force also will have the option to buy the KC-767s at the end of the lease for an additional per-airplane cost of \$40 million.

Aldridge, after seeing the terms of the deal as it was finally stated, told Defense Secretary Donald H. Rumsfeld that the Pentagon should “proceed with the lease arrangement.”

Only the First 100?

Rumsfeld agreed. Moreover, he also blessed language stating the



The KC-767 would be capable of carrying more gas and taking off from shorter runways than the KC-135 it replaces. Additionally, it would have the electrical power to host communications relays for other aircraft in the battle area.

intent of the Defense Department to “go beyond the first 100 767s” with additional acquisitions. Aldridge did not establish a final number.

The Air Force operates 544 KC-135s, said Aldridge, so the ultimate number of new aircraft likely will have to be “several hundred.” However, DOD will not replace the Stratotankers one-for-one.

The Air Force has until Nov. 1 to deliver to Rumsfeld a long-range plan for recapitalizing the tanker fleet. (“Recapitalize” means the replacement of one type of service equipment with newer equipment of roughly equivalent or somewhat better capability.) Aldridge said the plan will answer basic questions about numbers of aircraft and configuration that the service will need after this initial lease.

The new aircraft will generally match the KC-135 in size but will exceed the old aircraft in capability, having the power to take off faster, operate from shorter runways, and carry more fuel. It will also feature advanced digital electronics.

Moreover, the new airplanes will be able to generate an amount of electrical power sufficient to let the airplanes serve as communication relays in the sky.

Under terms of the deal, USAF would take delivery of the first KC-767s in 2006. Production would ramp up to 20 airplanes per year. By 2009, the Air Force will have received 67 tankers.

The new plan replaces an earlier Air Force effort that encountered difficulties. Aldridge noted that, had the Air Force pursued its previous plan to start recapitalization in 2006, it would not have received the first airplane until 2010, if then.

The only other option—buying the new airplanes outright—would have required expenditure of about \$8 billion in the 2004-09 Future Years Defense Program. However, no one believed the Air Force could come up with that kind of money.

“We would have had to take it out of some other program,” Aldridge said. “We’d rather lease and get the airplanes sooner than spend that much money earlier in the FYDP.”

There is urgency to doing this, said Aldridge. Tankers are “an essential part of our ability to do what we want to do in the military,” he went on, but the KC-135s are wearing out. After 40 years, they are plagued with corrosion, stress fractures, spar fatigue, and other maladies of old age.

The only other large tanker in service is the KC-10, of which the Air Force has only 59. If the KC-135 was grounded, it would mean massive problems for the entire military.

“We need to do this right now,” said Marvin R. Sambur, the Air Force’s acquisition chief.

A “Horrible” Prospect

Sambur told *Air Force Magazine* that USAF is dependent on KC-135s for almost 86 percent of its tanking.

A corrosion problem that called for immediate grounding of the type would be a “horrible” prospect, said Sambur, and would leave the service with no alternative means for aerial refueling.

Tankers were heavily used in Gulf War II, solving many access problems by extending the range of coalition aircraft from bases outside the immediate vicinity of Iraq. (See “The Squeeze on Air Mobility,” July, p. 22.) Tankers also routinely reduce the need for large bases around the world. They permit strike, cargo, and intelligence aircraft to fly long distances without landing. In the absence of the tankers, the operating radius of the entire fixed-wing inventory of the US military would be sharply reduced.

For example, had there been no aerial tankers in Operation Iraqi Freedom, Navy aviation would have only been able to fly a small fraction of the missions it flew, given the limited capacity of its own small refueling airplanes.

Because of the long lead times involved, there is no room for delay, Sambur asserted. The KC-135s “may not fall out of the sky” if the service doesn’t start recapitalizing now, he said, but “five to 10 years from now we could have catastrophes on our hands.”

Sambur maintained that the Air Force needs to “start doing the prudent thing right now,” which means “getting the insurance policy.”

Under the lease arrangement, Boeing would bear all of the development risk. The aircraft are to come into USAF hands already in refueling configuration.

The Air Force is preparing not only the comprehensive Nov. 1 report but also one that lays out the service case on four issues:

- There is a need for the tankers.
- The service explored all options.
- Leasing is superior to actual purchase.
- The terms make it a good deal.

That report was destined to move quickly to Congress after review at OSD and the Office of Management and Budget.

One option favored by some in Congress was to re-engine the KC-135 to increase its takeoff power, cruise speed, and other performance parameters.

However, such an upgrade will “not buy you any lifetime, and that’s

what we need to buy: additional life," Aldridge said. He added: "We're going to be flying KC-135s for a long time, and we're going to be very dependent on them, but we don't have to be dependent on all of them."

Under lease terms, Boeing's per-aircraft profit cannot exceed 15 percent. Should Boeing achieve better efficiency and achieve greater profits, it will simply have to reimburse the government or lower the price to the Air Force, said Aldridge.

Aldridge explained that any cost overruns would reduce Boeing's profit. "We will never pay more ... for this airplane," he declared, "and could, if things become optimistic, pay somewhat less."

Aldridge said he believes there will be sufficient support on Capitol Hill to get the lease arrangement approved.

McCain's Complaint

A prominent opponent is Sen. John McCain (R-Ariz.), who argues that the KC-135 aircraft, though old, could be maintained indefinitely and their effectiveness dramatically increased by a re-engining program, which would cost less than new airplanes.

The General Accounting Office, a Congressional watchdog agency, determined that re-engining 127 KC-135Es would cost about \$3.6 billion.

McCain calls the lease arrangement "corporate welfare" designed to raise Boeing's bottom line. The aerospace giant has been hard hit by



USAF photo by MSgt. Dave Ahlswede

If some problem grounded the KC-135 fleet, USAF would have to rely on KC-10s such as this one, of which there are only 59. A diversity of tankers would provide insurance against a fleetwide problem in the venerable Stratotanker force.

a downturn in the aircraft industry following the Sept. 11 terror attacks in New York and Washington.

McCain claimed Air Force Secretary James G. Roche has been "relentless in exaggerating aerial tanker shortfalls in order to win approval of the lease." This, said McCain, contradicts the Air Force's own studies, which have suggested the tanker fleet could be flown at least until 2040 with proper maintenance.

Sambur maintains that the studies to which McCain refers are old and no longer present an accurate view of the situation.

"A lot of people come back and say, 'Well, you had a report that said these things could last forever,' "

Sambur noted. "People keep coming back at us with this report, that the Air Force wrote a couple of years ago."

The report was written in "good faith," Sambur said. Soon after it was completed, he went on, the Air Force came face to face with some disturbing, real-life experiences concerning depot maintenance, and USAF found it had "greatly underestimated the effects of corrosion on these things."

Moreover, corrosion affects each airplane differently, making it impossible to predict where and how damage will occur.

Sambur said the previous report was like getting a clean bill of health from a doctor. That report is virtually worthless two years later; two-year-old assurances are no guarantee that you haven't developed a medical problem during the interim. Critics who use it to back their opposition to the lease are ignoring two years' worth of subsequent experience, in Sambur's view.

Now, with KC-135s having to be virtually rebuilt every time they visit the depot for tear-down inspections, the age issue has been sharply drawn.

The Air Force was required to make the "business case" for the lease to Rumsfeld, Sambur said. Part of that was a comparison of the present cost to maintain the KC-135 and the cost to lease the new airplanes.

Sambur said the Air Force took a conservative approach to estimating

The Basing Plan for the Tankers

The 100 Boeing KC-767 aerial refueling aircraft to be leased by the Air Force would be divided among three bases, according to an initial tanker roadmap released by the service on June 18.

The first active duty base to receive the new 767 tankers will be Fairchild AFB, Wash. Deliveries will start in 2006, and the base eventually will have 32 KC-767s. Following Fairchild will be Grand Forks AFB, N.D., getting up to 32 by 2009, and MacDill AFB, Fla., 32 by 2011.

USAF plans to add infrastructure and personnel at all three locations.

The remaining four KC-767s will be backup inventory to replace aircraft down for maintenance or otherwise sidelined from duty.

The proposed lease of the new tankers coincides with the planned retirement of all remaining KC-135Es—the average age of which exceeds 43 years—and the redistribution of the KC-135R fleet. (See "Aerospace World: Plans Set for Tanker Basing," p. 12.)



USAF photo

Some favor re-engining the KC-135Es, as was done with KC-135Rs like this one. However, senior leaders point out that re-engining does nothing to solve corrosion and age problems on the Stratotanker fleet.

the rising cost of KC-135 maintenance. Even so, he said, the Air Force analysis showed the service could go out and acquire the new aircraft for the “net present amount” needed to maintain the old aircraft.

The Cost of Aging

The KC-135 maintenance cost has increased since 1993 by an average of more than 18 percent per year, Sambur said.

This was the figure used in the official analyses, but “as these things get old ... you’d have a pretty good case to say, well, it’s going to get worse than that,” said Sambur.

Even with 100 new KC-767s, the Air Force will have to keep at least some of the KC-135s flying for many years to come. If the Air Force brought on board a second batch of 100 leased tankers—as it thinks it must do—it would still be flying KC-135s for decades, Sambur said.

Because no one has ever flown whole fleets of 40-year-old airplanes, it’s impossible to say with certainty how long the KC-135s will last, Sambur added.

The Air Force wants to take out of service the 133 most aged KC-135Es. Sambur said it is simply an issue of money. Air Mobility Command said these tankers are already flying with restrictions, are the most problem-prone, and require the most extensive depot maintenance.

Of the \$138.7-million-per-KC-767 cost, \$131 million will accrue to

Boeing to cover materials, labor, and provide a profit margin. The other \$7.7 million per aircraft will go to a “special entity” set up to administer the lease. It will cover interest payments for Boeing construction loans and long-lead purchases.

Boeing will also perform major maintenance and overhauls on the aircraft and will receive about \$3.6 million per aircraft per year for this work.

When the legislation enabling the lease was enacted, some suggested that the Air Force would have to pay both to modify the airplanes to tanker

configuration, then, at the end of the lease, convert them back to cargo or passenger configuration. There was also the suggestion—from Roche himself—that USAF would receive “white tails”—airplanes made available by cancellations of commercial orders.

This is not true in either case, according to Bob Gower, Boeing’s vice president for tanker programs.

“All of the airplanes are ‘new build’ airplanes, and none of them are sitting on our ramp,” Gower told *Air Force Magazine*.

Aldridge suggested that, because the financially strapped Boeing might shut down its 767 line, the Air Force had a need to move quickly. According to Boeing officials, this is also not true. Gower asserted, “Our plans were and are to continue producing the 767 as long as it’s commercially viable, and it’s still commercially viable.”

Boeing has enough tooling to support the production of as many as seven 767s a month at its Bremerton, Wash., plant, Gower said. “Green tail” 767s would go to Boeing’s Wichita, Kan., facility for conversion to tanker configuration.

The 767-200 made its debut in 1982, but the aircraft has been continually updated since then, Gower said. The model that is being offered to the Air Force has an all-digital cockpit, as well as a new boom operator’s station just aft of the cockpit. From there, the boom operator



USAF photo by AIC Franklin J. Perkins

In depot, KC-135s are having to be virtually rebuilt as corrosion is found eating away at skin, stringers, and spars. No one has ever operated a fleet of 40-year-old aircraft before, and maintenance costs are climbing more than 18 percent a year.

can observe all the aircraft behind the tanker using multiple cameras. The station will be identical to a simulator, saving training costs.

Internet in the Sky

The airplane will also have a 120 KVA generator to support the additional communications gear USAF wants to install on the airplane, making it a “smart tanker.” The generator is included in the price, and so is Link 16 data-sharing capability, but the additional communications gear—which would make the airplane “an Internet in the sky,” according to Chief of Staff Gen. John P. Jumper—would be an extra cost.

The KC-767 will also have a receptacle so that it, too, can be refu-



USAF photos by TSgt. Mike Buyias



The PACER CRAG KC-135 update brought the fleet up to current international navigation and communications standards and was initially thought sufficient to keep the fleet flying indefinitely. Reality has since set in. The Pentagon intends to go beyond 100 KC-767s, eventually replacing most of the fleet.

eled in midair. This feature will multiply the options available to combatant commanders. So will the fact that the KC-767, fully loaded, will be able to take off using a runway of only 7,700 feet. The KC-135 requires more than 12,000 feet.

The original estimate to lease 100 airplanes ran to \$26 billion. The price has now fallen to \$16 billion, but, according to Aldridge, that was possible only under certain conditions. The most important was the Pentagon's declaration of its intent to expand the arrangement beyond just 100 airplanes. Boeing needed to see this intent, said Aldridge, because it

eliminated some of the risk the company faced.

Moreover, caps were imposed on some expenses, Aldridge noted, and the Air Force agreed to do without certain items that were on the original work plan. “As the Air Force has gone through this process,” said Gower, “they really have used the cost-as-an-independent-variable approach in trying to figure out what they would like to have and what they can afford.”

Example: Though USAF wanted plumbing in the wings for wingtip probe-and-drogue refueling, to lower cost, it dropped the requirement. The aircraft will have both a boom-type

refueling system and a probe-and-drogue, both on the centerline.

The Air Force wanted a “combi” configuration permitting it to carry passengers and cargo at the same time. This would have required building a special bulkhead, so the plan was dropped.

Sambur bristled at the suggestion that the Air Force was working a special deal to bail out Boeing. He maintained that, had the Air Force attempted to start a new tanker from scratch, it could easily have taken until the mid-2010s to get the first airplane, and development costs would probably have killed the project at the outset.

Sambur said the project is an example of “agile acquisition.” The idea was to buy something “proven, off the shelf, [that] gives us great capability.”

Pressure from OMB, as well as the federally funded think tank Institute for Defense Analyses, kept the price down, too, Sambur added. Thanks to this pressure, he went on, “We were able to get Boeing to really prove they were giving us a good deal.”

One of the hardest “sells” was the Pentagon's program analysis and evaluation shop, Sambur noted. “PA&E ... was very concerned about whether we really needed a tanker. They were convinced at the outset that we could re-engine [the KC-135]. And they had some very good arguments.”

In the end, however, the constellation of need, price, opportunity, and logic won the day. ■

IN ONE of the last major actions of Gulf War II, the coalition mounted a heavy bomber strike on a Baghdad site thought to be the hiding place of Saddam Hussein and his sons. The first step was for planners to confirm and approve the target. Once that happened, a very short operational sequence commenced.

An Air Force E-3 Airborne Warning and Control System aircraft orbiting above Iraq got the “go” signal. The AWACS relayed the tasking and coordinates to a nearby B-1B. The bomber crew keyed in the data. Twelve minutes later, the target lay in ruins.

“This is the big one,” said an anonymous air battle manager aboard the E-3, a modified Boeing 707 with a rotating radar atop the fuselage.

He might have said the same about the sophisticated radar aircraft that monitors, tracks, and directs air traffic. Airborne battle management with the E-3—and with the E-8C Joint STARS, in the case of ground targets—gives the United States an awesome asymmetric advantage.

This ability to command and control forces from the air means that battle managers can always be in-theater, unrestricted by access concerns or host nation sensitivities.

By combining advanced intelligence-surveillance-reconnaissance capabilities with battle management systems, E-3s and E-8s often leave opposing forces nowhere to hide. US forces, meanwhile, enjoy unsurpassed battlefield awareness.

Like AWACS, Joint STARS also played a critical, behind-the-scenes role in Iraq but in a different venue. It located, tracked, and helped lead the attack on moving ground targets.

The E-8, a joint USAF–Army system, aided the Army’s AH-64 Apache attack helicopters. The Army helicopters early in the war struggled with the problems of blowing sand and unconventional enemy tactics—many AH-64s were knocked out of service. Maj. Gen. David H. Petraeus, the Army’s 101st Airborne Division commander, said the Army changed tactics, working with the E-8s and other support aircraft for a number of successful operations.

“When we could not get the target definition that we needed, we went to



USAF photo by TSgt. Keith Brown

Command From the Air

USAF’s premier airborne battle management systems often leave enemy forces nowhere to hide.

By Adam J. Hebert, Senior Editor

AWACS aircraft give the US and its allies an awesome combat advantage. E-3s, such as this NATO bird, provide not only unmatched air surveillance but also the ability to direct combat aircraft over a battlefield.

daylight, deep armed reconnaissance operations," Petraeus said. These missions, which destroyed "very significant targets on a number of occasions ... had J[oint] STARS supporting them, to direct them," he told reporters.

Looking Through Sand

The advantage conferred by airborne battle management led to what some have described as the decisive point of the war.

At the end of March, when blinding sandstorms immobilized most US and enemy ground forces, Air Force systems such as Joint STARS and other radar platforms kept an overhead watch and were able to "see" through the storm and spot enemy vehicles. The E-8s directed air strikes against opposing forces that attempted to move under the cover of the sand.

The airborne battle management systems also coordinated more mundane events, such as the constant rotation and assignment of hundreds of coalition aircraft that needed mission updates, tankers, and landing sites across Southwest Asia.

The Air Force has 31 AWACS aircraft. The E-3 can track low-flying aircraft at a distance of more than 250 miles, with coverage extending farther for higher-altitude systems. It does this while simultaneously identifying hostile aircraft and offering secure communications capabilities.

The US does not have a monopoly on this system. Several US allies, including the NATO alliance, have purchased their own AWACS fleets. NATO as a whole operates 17; Britain has seven; Saudi Arabia has five; France has four; and Japan has four.

NATO gave thought to operating a similar fleet of Joint STARS aircraft, but this plan never materialized. The US remains the only nation that deploys an operational system and has 15 Joint STARS, each capable of tracking numerous ground vehicles at distances up to 150 miles. Another two Joint STARS have been procured and will join the fleet in 2004 and 2005.

The E-3 and E-8 are classic low-density, high-demand systems, constantly overtaxed by the warfighting commanders in times of crisis. This chronic overuse strains both the aircraft and their crews. According to Lt. Col. Gene Lee, who helps manage the career field at the Pentagon, air battle managers have been tasked "beyond maximum surge capacity"



The E-8 Joint STARS helps to coordinate and manage the battle on the ground. The Air Force has a validated requirement for 19 operational aircraft.

nonstop since the Sept. 11, 2001, terrorist attacks in the United States.

Over these two years, the crews have gained valuable experience and developed great proficiency in what they do. These constant deployments, however, have begun to take a toll. USAF officials say it may take up to two years for the service fully to reconstitute the fleets—that is, for the crews to be rested and trained and for the aircraft to have undergone a complete maintenance cycle.

Training Deficits

It takes a while to catch up on training. During the time they are deployed, air battle managers don't use all their skills, and training deficits accumulate. Making a bad situation worse is the fact that the Air Force cannot bring on new battle managers because there are no E-3s available for schoolhouse duties. Even if there were, there would be no instructors to integrate the schoolhouse grads into operational units.

By June, all E-3s were headed back to their home base at Tinker AFB, Okla.—the first time that had happened since before the Gulf War of 1991. The AWACS aircraft for more than a dozen years had been "sitting out in the desert" of Saudi Arabia to support operations Northern and Southern Watch over Iraq, said Lt. Col. Dexter Griffin, another air battle manager at the Pentagon.

Griffin said returning the AWACS aircraft to Tinker shapes up as an important first step in restoring the

fleet's long-term health. Although the ultimate goal is to curb the appetite of warfighting commanders for the aircraft, "the real challenge is ... to be able to bring that jet home," he said.

The air battle manager career field is feeling the strain. In the mid-1990s, the Air Force drastically limited production of new battle managers, much as it did with pilots and navigators. It is now paying the price for that move.

Since bottoming out at zero in 1995, the production of new air battle managers has risen again. The force brought in 134 new managers in 2002. The career field, authorized for about 1,300 personnel, remains about 200 short of requirements, but officials say this shortage will be reduced.

About three-quarters are assigned to AWACS units at any given time, but the managers move between E-3s, E-8s, and ground-based air control stations for different assignments.

Air battle managers became a rated career field in 1999. This designation ensures USAF's top leadership pays attention to air battle manager staffing levels, as is done for pilots and navigators.

The aircraft themselves are in need of improvements. Col. Robert Gordon, space and command, control, communications, computers/ISR "champion" in the Air Staff's operational capability requirements office, said the Air Force needs to upgrade the systems to ensure it can, in the future, defeat enemies who are "more prepared" than Iraq.

First, battle damage assessment still

must be improved. BDA has "consistently shown to be a problem in the past," he said, and the experience in Operation Iraqi Freedom was no different. Assessment is the last stage of the kill chain.

Second, the Air Force needs to improve the way it prioritizes the flow of information. USAF must be sure the right person is getting the right information at the right time—and in a way that is immediately usable.

"Some of the things we do are still very manpower-intensive," he said, adding that a long-standing goal is to increase the amount of processing done by machines so humans can concentrate on what they do best—making decisions.

Finally, blue-force identification remains a concern. Preventing so-called "friendly fire" incidents has been a major emphasis over the years, and a primary mission for the E-3 is to differentiate between friendly, hostile, and unknown aircraft. Yet fratricide still occurs on occasion.

Stronger AWACS

The E-3 entered service in 1977. The Air Force recently modified the aircraft to a Block 30/35 configuration, giving it a secure, anti-jam communication system, computer upgrades, and Global Positioning System compatibility.

Maj. Gen. Robert F. Behler, commander of the Air Force Command and Control and ISR Center at Langley AFB, Va., said further AWACS up-

Racking and Stacking the E-10 Radars

The Air Force won't know—or say—for quite some time just how it will structure all of the radar capabilities for the E-10 multisensor command and control aircraft, or MC2A.

However, USAF does know it will start out with a Joint STARS-like ground surveillance system and cruise missile defense capabilities. Those are considered areas of greatest need.

According to Col. Edward Goehe, director of the MC2A office at Langley AFB, Va., the E-10's counterland mission will feature a next generation ground moving target indicator (GMTI) sensor.

The first capabilities spiral will also feature a "focused" air moving target indicator (AMTI), for cruise missile defense capability, and "an open system architecture facilitating BMC2 mission suite subsystem integration."

The E-10 is being designed with flexibility in mind, and the goal is to have a single aircraft perform multiple missions. This would be accomplished simply by changing the programs that battle managers use at their workstations in the back of the airplane.

Future E-10 spirals may add an air surveillance radar similar to that used by the E-3 for the airborne early warning mission. It is not yet known whether the air- and ground-surveillance missions can be combined on a single airframe.

Plans call for conducting studies to determine if combining GMTI and a 360-degree AMTI sensor on a single aircraft "is possible," Goehe said in a written statement.

If the AWACS-style airborne early warning mission is incompatible with the Joint STARS-style mission, airborne early warning "will be hosted on a second MC2A fleet configuration, leaving us with two distinct variants," Goehe added.

The Air Force envisions several other capabilities for the E-10s. These include ability to control unmanned aerial vehicles from the air, Space Based Radar coordination, and ISR management functions, officials say.

Final decisions on the exact configuration and E-10 fleet size will have to wait until Air Force studies have determined exactly how to divvy up or combine the missions. Overall, however, the E-10 is not expected to replace 69 E-3s, E-8s, and RC-135s on a one-for-one basis.

Officials are quick to point out that the E-10 is but one part of a future constellation including next generation sensors and ground and space systems. And the AWACS and Joint STARS that the E-10 will notionally replace will likely remain in service for decades.

grades—to Block 30/45 configuration—are "making the back end of the aircraft much more efficient."

Networking is also creating efficiencies. Network Centric Collaborative

Targeting can link the AWACS air picture with Joint STARS ground information and signals intelligence from the RC-135 Rivet Joint. NCCT is "taking all that and putting it over a data link, so you can do the collaborative targeting," increasing the effectiveness of each platform, Behler said.

Plans call for the greatest possible integration of these capabilities aboard one system, the E-10 multisensor command and control aircraft. Today, say Air Force officials, command and control systems are afflicted by too many stovepipes, despite a concerted effort to break down the barriers that separate various functions. Air operations centers continue to expand as the Air Force fields new capabilities that require additional administrators and support personnel.

Using the E-10 to cut across the stovepipes should save both money and time, officials say. By integrating multiple ISR and airborne battle management functions, the E-10 could end the current situation in which AWACS controls air-to-air missions,

Staff photo by Guy Aceto



Air battle managers such as these Joint STARS crew members work at two of the many computer and communications workstations used to coordinate combat operations.



The initial E-10 (shown here in an artist's conception) will combine cruise missile defense and the E-8's ground surveillance capability.

Joint STARS runs air-to-ground missions, and Rivet Joint performs intelligence operations.

The E-10 will be the centerpiece of USAF's next generation command and control constellation and eventually will assume the missions currently performed by several aircraft.

In May, USAF awarded a team of Boeing, Northrop Grumman, and Raytheon a contract to develop the first iteration of the E-10. The aircraft's battle management C2 systems will be competed and developed separately.

Plans call for Increment 1 of the E-10 to offer airborne ground surveillance and targeting capability similar to that provided by Joint STARS, plus cruise missile tracking capabilities.

The "most needed" capabilities are being developed first, one official said, but the platform promises flexibility. The E-10 is based on modern Boeing 767s that will be larger and more reliable than the old 707s that host the current BMC2 aircraft. Four Increment 1 aircraft will be built, enough to provide warfighting commanders with one on-station aircraft, around the clock, in a given war zone.

"Fly-In" Command

The E-10 will provide a rapid fly-in command capability for areas that lack formal air operations centers or that present access problems, such as the Pacific theater. While many BMC2 functions can now be performed via reachback to permanent facilities, that capability is never guaranteed.

The E-10 is expected to be a force enhancer, even if there is a permanent theater AOC available. It may offer the best view of the battlefield, given the aircraft's altitude and onboard sensors.

The extra size available in the 767 platform should pay dividends. The E-3 and E-8 both have fewer than 20 "back-ender" workstations for the air battle managers, but the E-10 could hold as many as 60 operators, if required.

Officials note that this could enable the E-10 to become a valuable joint command center. The E-10 can serve as a commander's airborne "tactical execution arm," according to Col. Bruce Sturk, director of warfighting integration at the AFC2ISRC. This would free AOC officials to think strategically and longer term.

Officials note that the E-10 should be able to generate flexibility at the workstation level. Individual stations will perform a wide variety of missions, based on changing operational needs. Currently, AWACS-unique and Joint STARS-unique workstations require air battle managers to move from station to station to perform different functions.

What if, Sturk asked, changing the aircraft's mission were as simple as asking, "What's the mission today?" Air Force officials "see a lot of joint capability," in the system, Sturk said.

The E-10 appears to fit in well with US Strategic Command's new global strike responsibilities. Retired Gen. Richard E. Hawley, former commander

of Air Combat Command, notes there are many ways the aircraft could help the joint commander. For example, to coordinate a strike halfway around the world, against an emerging target, a STRATCOM commander might want an airborne BMC2 aircraft in the theater. The E-10 would be able to set up an orbit anywhere in the world in less than a day.

The same aircraft could be used at other times to oversee a hostage rescue operation or to coordinate an air strike against a terrorist camp. The bonus, experts say, is that reprogramming the E-10 for various missions would be as simple as loading different programs into the workstations.

STRATCOM, special operations forces, or a hostage rescue mission would all require slightly different C2 systems, Hawley said. By making the back end reprogrammable, the E-10 could quickly be tailored to the specific mission.

The key is to properly "envision the scenarios in which a commander might want [the E-10]," he said. Since flexibility is planned from the start, joint applications should not have a significant cost impact, Hawley added.

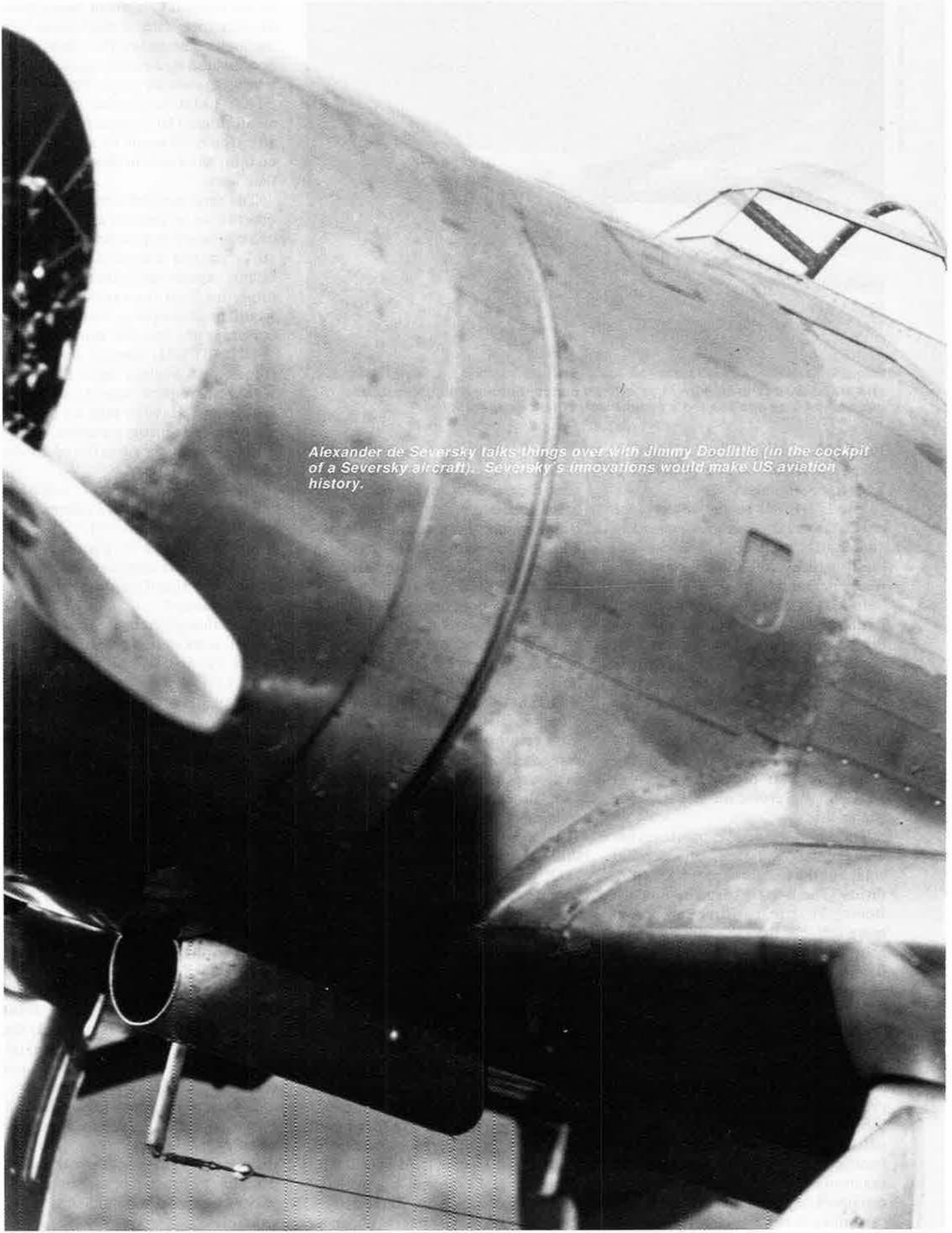
Even though there are a finite number of workstations available, they could be distributed according to need. Lt. Col. Rick Painter, a planner working under Sturk, cited an example. Assuming the E-10 has 60 seats, a joint force air commander might devote 40 seats to BMC2 functions in a global strike operation.

In another scenario, however, 20 air battle managers could perform BMC2, while 40 seats were devoted to sensor management, Painter noted. The same air battle managers could perform both functions.

Sturk said that at this time all E-10 configurations are notional: "We don't know how many operators we need."

In any event, the center is working closely with the nearby US Joint Forces Command to ensure that the joint airborne battle management requirements are fully understood and taken into account by planners.

It's an ambitious goal. The Air Force says that, when it comes to airborne battle management, it hopes ultimately to achieve "zero latency." That buzz phrase means, simply, no wasted time and instantaneous strike capability. ■



Alexander de Seversky talks things over with Jimmy Doolittle (in the cockpit of a Seversky aircraft). Seversky's innovations would make US aviation history.

Sasha the Salesman



Neither wooden leg, nor corporate intrigue, nor poor elocution could keep de Seversky from his mission.

By Phillip S. Meilinger

DURING World War II, Alexander P. de Seversky was one of the best-known aviation figures in America. He was a fighter ace, war hero, aircraft designer, and writer. His passion was airpower, and his mission was to sell the American people on its importance. He did a good job of it.

He was born in June 1894 in Russia and, at age 10, went off to military school, graduating from the Russian Naval Academy in 1914 just as the Great War erupted. After several months on a destroyer, Seversky transferred to the Navy's flying service, soloing after a total flight time of six minutes and 28 seconds.

Seversky—"Sasha" to his friends—was posted to the Baltic Sea area, but his first combat mission met with disaster. While attacking a German ship at night, his aircraft crashed into the water. The concussion detonated one of the bombs, which killed his observer and blew off his own right leg below the knee. Seversky, after eight months in convalescence, returned to duty with an artificial limb.

Assigned a job in aircraft production, Seversky designed devices that made a pilot's job easier: hydraulic brakes, adjustable rudder pedals, and special bearings for flight controls. His inventions won him an award in

1916 for the top aeronautical ideas of the year.

Although this work was important, Seversky wanted to return to flying. He was told that this was impossible. Nevertheless, when a group of dignitaries arrived to witness the test flight of a new aircraft, Seversky replaced the scheduled pilot and put the aircraft through its paces for the assembled crowd.

Upon landing and revealing himself as the pilot, there was an uproar, with talk of a court-martial. But the Czar heard of the incident and, deciding Russia needed colorful heroes, intervened to have Seversky returned to flying duty.

There he did well. Over the next year he flew 57 combat missions and shot down 13 German aircraft. On one mission he bombed a German airfield and then attacked seven airplanes in the air, shooting down three. This exploit earned him a Gold Sword presented by the Czar. His wooden leg seemed not to bother him. In fact, he claimed it made him a better flier because it forced him to think about what he was doing rather than rely on physical ability.

It's Only a Wood Wound

Even so, the war remained dangerous: His good leg was broken in an accident, and on one mission he was shot in the right leg—although now he needed a carpenter rather than a doctor.

In mid-1917 Lieutenant Commander Seversky's squadrons on the Baltic came under shell fire from the German fleet. Jumping into one of his airplanes, he took off, but his damaged aircraft did not get him far. After stripping his airplane of its guns, he set it afire and began walking toward the Russian lines.

Unfortunately, he ran into a band of Estonian peasants who considered turning him over to the Germans for a reward. Upon learning their captive was the famed "legless aviator," however, Seversky was sent on his way—with his machine guns. For this escape he received the Order of St. George, Imperial Russia's highest decoration. After the October 1917 Communist Revolution, he was posted to Washington as an attaché and elected to remain in America.

Seversky was young and aggressive and soon opened a restaurant in Manhattan. He fell in love with



Photo from Bert Rieger via Warren Thompson

The Seversky SEV-3 amphibious aircraft had many variants, one of which was the P-35, America's first modern fighter airplane.

America, and when fellow immigrants would complain, he would grow impatient and exclaim, "If you don't like it in this country, you can always go back to Brooklyn."

Sasha still viewed aviation as his chief interest, and he soon began working for the Army Air Service at McCook Field, Ohio.

Over the next several years, he worked on an idea he had conceived during the war. Seversky, while flying in formation with another Russian airplane, had playfully reached up and grabbed the trailing wire radio antenna of his mate, flying along "connected" to the other airplane for several minutes. He suddenly realized that a tube could also be used to transfer fuel from one aircraft to another in flight.

Combat had taught him that bombardment aircraft were vulnerable to enemy fighter airplanes, so escorts were necessary. However, fighters had not the range to escort bombers all the way to the target and back. Air refueling offered a solution.

Seversky's wartime superiors were not interested, but he revisited the idea at McCook Field. The result was the air refueling device used on the *Question Mark* flight of 1929 when an Air Corps aircraft remained aloft for seven days.

The Major

In 1927 Seversky became a US citizen and, in 1928, was commissioned a major in the Air Corps Reserve. He was always proud of regaining mili-

tary rank and for the rest of his life preferred to be addressed as "Major."

He founded Seversky Aircraft Corp. in 1931. Over the next decade, he perfected a host of patents and designs, including split flaps, metal monocoque construction, fire-control units for aircraft guns, retractable landing gear and pontoons, and specialized aircraft flight instruments. His innovative SEV-3 amphibian set world speed records in 1933 and 1935, and a derivation of this model became the P-35.

The P-35 was the first all-metal monoplane fighter with an enclosed cockpit to be mass-produced in the US. It incorporated such innovations as retractable landing gear and cantilever wings. It was also extremely fast; a civilian version won the Bendix Air Race in 1937, 1938, and 1939. Considering that contemporary fighter airplanes were barely able to keep up with the new B-17, this was quite a feat.

In addition, the P-35 had an unusually long range—it could fly from coast to coast with only two refuelings. Remembering his war experiences, Seversky recognized the need for fighter escorts. One solution was his air refueling device, but, in the late 1930s, such a practice was considered inefficient and costly. The question was: How to extend the range of aircraft without air refueling?

Designers thought a long-range escort fighter technically impossible, reasoning that an airplane with the necessary range would have to be so

large it would be like the bombers it was designed to protect—easy prey for enemy fighters.

Seversky, however, believed a long-range escort could be made possible by use of internal fuel tanks (“wet wings”), which would not sacrifice the attributes that also made a successful fighter. When Seversky suggested this to the Air Corps, he was turned down. Air leaders would come to regret that decision.

Seversky was a talented aeronautical engineer (in 1940, President Roosevelt awarded him the prestigious Harmon Trophy), but he was not a skilled businessman. His corporation never made much money and was constantly behind in meeting its production orders. Seversky argued this was because his aircraft were so original they required new manufacturing techniques, and creating them took time. The Air Corps—and, indeed, most of his senior colleagues in his own company—disagreed.

Gen. Henry H. “Hap” Arnold, the Chief of the Air Corps, liked Seversky’s airplanes. However, as war approached, he had an even greater attraction to aviation companies that were able to meet the challenges of greatly increased production. The Seversky Corp. had a part to play in mobilization but only if it would restructure its senior management. In short, Arnold wanted Seversky out of Seversky.

Corporate Putsch

In May 1939, while he was out of the country, the firm’s board of directors removed The Major from the post of president, and, in October, it ousted him from the company entirely. The corporate name was changed to Republic.

In truth, Seversky’s removal from the business had positive results: Republic was reorganized. The P-47 Thunderbolt, the descendent of The Major’s P-35, was built in huge numbers and would become vital to American air success in the war. On the basis of his track record, many have concluded that Republic would never have responded so effectively if Seversky had been at the corporate helm. In addition, unemployment left him with time for other pursuits. Specifically, he used his considerable charm and communication skills to write and talk about his favorite topic: airpower.

Seeing it as his duty to educate the American public about modern war, Seversky over the next decade produced two books, wrote scores of articles, and gave hundreds of radio addresses. Several campaigns in the European war left lasting impressions on him. First, Germany’s quick defeat of Poland in September 1939 convinced Seversky that airpower had come to dominate ground forces, and this lesson was reinforced by Germany’s campaign in France in 1940. Most of the world was shocked by France’s rapid collapse, but Seversky simply remarked that the Maginot Line had become the tomb for a nation that refused to look skyward.

Other campaigns gave different lessons: Norway and Crete demonstrated the superiority of airpower over naval forces. In both instances the Royal Navy, reputedly the finest in the world, had been decisively repulsed by the Luftwaffe. At Crete, for example, the Luftwaffe sank three British cruisers and six destroyers, while severely damaging several other major warships. Weakened by such staggering losses, the fleet was unable to prevent the island’s loss.

Seversky collected these thoughts and, in February 1942, published *Victory Through Air Power*. The book’s purpose was twofold: to alert America to the challenges of a modern total war and to offer a strategy based on airpower for fighting that new form of war.

Victory first took the reader through

a brief—and selective—history of the war to that point. Seversky reasserted that airpower was the key to victory and that traditional forms of land and sea warfare had been eclipsed by the airplane. Seversky emphatically declared that war was undergoing a revolution and that America needed revolutionary responses. Unfortunately, the United States was not prepared for this challenge.

Seversky argued that American fighter airplanes were inferior to those of other belligerents. They had not the speed, range, altitude capability, or armament of front-line enemy fighters. Yet press releases emanating from the Army Air Forces and the government pretended American airplanes were the best in the world. Seversky rejected such claims with disdain.

He did not argue that airpower alone could win the war. Rather, he maintained the airplane had become the dominant and decisive element in modern war. The vital role of land and sea forces was to hold the enemy in place while airpower pounded him into submission. In addition, the Army and Navy were needed to seize air bases from which to launch strategic air strikes against the enemy’s heartland.

In his book, Seversky rejected the notion that “popular will” could be a legitimate target. The war had demonstrated that the civilian populations have a surprising resiliency, and prewar predictions of how quickly



In 1947, Seversky received a second Harmon Trophy, this one from President Harry Truman. The award cited his outstanding leadership and devotion to aeronautical progress. Standing center is Secretary of War Robert Patterson.

urban dwellers would panic and break under air attack had been proved wrong. Seversky therefore emphasized industrial targets.

Catcalls and Cheers

Victory Through Air Power provoked a mixed critical reaction. Soldiers and sailors characterized it as inaccurate and dangerous. Some airmen also were concerned, upset about The Major's stinging attacks on his old nemesis, Hap Arnold—the man who had helped his erstwhile colleagues wrest away control of the Seversky Corp.

On the other hand, the public's response was enthusiastic. Because it was chosen as a Book-of-the-Month Club selection, it was guaranteed a wide and literate audience. More than five million Americans read it. Pollster George Gallup estimated that Seversky and his message were known to more than 20 million Americans—an astounding figure in pre-television days.

So well-known was Seversky that Walt Disney proposed turning *Victory* into a movie.

The famed cartoon filmmaker said that, although millions had read Seversky's book, many others had not. His ability to use visual images and cartoons would serve to educate them as well. Disney expected to lose money on the movie. However, he stated, "I'm concerned that America should see it and now

is no time to think of personal profits."

Disney's movie opened in July 1943. It showed The Major in his office, surrounded by maps, airplane models, and blueprints. There, he related his message of airpower's importance in modern war. In 1933, Seversky had taken a Dale Carnegie course in an effort to improve his speaking skills. Nonetheless, in rehearsing the movie script, he stated that German troops landed on Norway's beaches—pronouncing the last word as if it were a female dog.

At that point, Disney decided that The Major needed elocution lessons.

Superb graphics illustrated his ideas. Nazi Germany was depicted as a huge iron wheel with factories at the hub, pumping airplanes, tanks, ships, and other war equipment out the spokes to be used along the thick rim. Allied armies chipped away at this rim by attacking individual tanks and artillery pieces, but the Nazis simply redirected war material from one spoke to another to counter the threat; the rim was too strong to be broken. Aircraft then bombed the



Photo from Berl Rieger via Warren Thompson

Seversky flies a P-35 prototype. The P-35 was the first all-metal monoplane with an enclosed cockpit. The long-range, extremely fast escort fighter won three consecutive Bendix Air Races in the late 1930s.



The P-47 Thunderbolt was a descendent of Seversky's P-35. It was manufactured in huge numbers and would prove vital to the war effort. After *The Major's* ouster as company president, Seversky Corp. became Republic Aviation.

factories of the hub, destroying them and causing the spokes to weaken and the rim to collapse.

In another memorable movie sequence, Disney depicted Japan as an octopus with its tentacles stretched across the Pacific and encircling dozens of islands. Allied armies and navies attempted to hack away at these thick tentacles and free the islands, but it was futile. American airpower, represented by a fierce, powerful eagle, repeatedly struck the head of the octopus with its sharp talons, forcing the beast to release its hold on the islands and attempt to defend itself. It was unable to fend off the eagle and eventually expired under the attacks. Victory was achieved through the air.

Even Hirohito

Although not a commercial success, the film had a significant im-

pact. The film did not repeat the Seversky book's nasty comments about Arnold. As a result, the Army Air Forces embraced the motion picture wholeheartedly. Winston Churchill saw the film and insisted that President Roosevelt watch it with him during their August 1943 summit in Quebec. Soon after the war, Seversky interviewed Emperor Hirohito, who claimed to have watched the movie and been deeply troubled by its predictions concerning the fate of his country at the hands of US airpower.

As the relationship between the US and the Soviet Union turned confrontational, Seversky became a cold warrior, deeply suspicious of Kremlin intentions. He saw violent confrontation as being inevitable. To Seversky, it was common sense to face such an enemy utilizing America's unique strength—aeronautical technology. Airpower, especially armed with nuclear weapons, seemed the only sane path to provide a "Pax Democratica."

When North Korea invaded South Korea in June 1950, Seversky argued strongly against American involvement, believing it played into Soviet hands. The US would be drained of its resources fighting a peripheral war against Soviet proxies, he argued.

A second Seversky book—*Air Power: Key to Survival*, which was published soon after the outbreak of the war—prophesied that Korea would fester inconclusively for years. Seversky claimed that the Book-of-the-Month Club wanted to feature his new work, but it was displeased with his comments regarding the Korean War. The club's contacts in Washington said the Korean "police action" was a minor distraction and would be over quickly. Seversky, however, would not modify his views. When he refused, club officials backed out of the deal. Seversky noted ruefully that, because he told a truth no one wanted to hear, his book sold 30,000 copies instead of 600,000.

In the Eisenhower years, "massive retaliation" became official US



Aeronautical scientist Theodore von Karman, Seversky, and Korean War ace Capt. James Jabara talk at dinner. Seversky became nationally famous for his outspoken views on airpower and defense.

strategy. The Major embraced it (indeed, his writings since the end of World War II had called for much the same thing, though without the catchy title). He rejected notions of limited war, stating they inevitably ended in stalemate. Moreover, the special advantages of airpower were lost in such conflicts; Korea was an aberration, he argued, and it must stay that way.

Seversky continued to write until the mid-1960s, but his published works became repetitious and technologically dated. The Major periodically lectured at Maxwell AFB, Ala., instructing young officers in airpower theory. He could, even in his seventies, still deliver a spell-binding speech.

The Major died in 1974 at age 80.

Seversky was the most effective and prolific airpower advocate of his era. Because of his homey, down-to-earth style, he spoke the language average Americans could understand. His ideas on airpower were not original. Virtually everything he proposed had already been articulated by someone else. Seversky's role was to take these ideas, repackage them, cover them with a modicum of technical credibility,

and then sell them to the American people. His popularity was enormous, and his publication record was staggering. Scarcely a month went by, during World War II and the decade after, when his articles did not appear in major magazines. Because his target audience was the average American, he wrote for publications like *Reader's Digest*, *The Atlantic Monthly*, *Ladies Home Journal*, and *Look*—a huge and diverse readership. Tens of millions of Americans knew of Seversky, and he enjoyed an access to the media and the people that was the envy of anyone attempting to influence public policy.

The ideas Seversky was selling were basic and uncomplicated, and this was not altogether good. Like many other air theorists, Seversky exaggerated the effectiveness and efficiency of airpower. He was convinced that a finite number of airplanes and bombs, delivered on a variety of targets, would equate to victory. Air strategy consisted of destroying target sets—a far too simplistic view.

Yet, Alexander P. de Seversky was able to capture the essence of the air weapon and then convey an understanding of that essence to millions of Americans like no one else before him or since. He made terms like "victory through airpower" and "peace through airpower" familiar to an entire generation. Sasha was indeed an unparalleled salesman. ■

*Phillip S. Meilinger is a retired Air Force command pilot with a Ph.D. in military history. His latest book is *Airwar: Theory and Practice*. He is currently deputy director of the Aerospacecenter at Science Applications International Corp. His most recent article for *Air Force Magazine*, "More Bogus Charges Against Airpower," appeared in the October 2002 issue.*

Under Eisenhower, strategic airpower became the centerpiece of US military strategy.

The "New Look"

DURING the early 1950s, the Eisenhower Administration ushered in what came to be called the "New Look" in US strategic affairs. It was a major transition, one that pushed strategic airpower—and thus the United States Air Force—to the forefront of the nation's Cold War defense policies.

Gen. Dwight D. Eisenhower, World War II's Supreme Commander, Allied Expeditionary Force, had won the 1952 Presidential election and took office in early 1953, just as the trauma of the Korean War was headed toward an armistice. The hard-fought war marked a major turning point in US security affairs. Its aftermath would see a rise in the importance of a large nuclear deterrent force.

The Korean War had sparked a huge US buildup, and there would be no going back to the status quo ante. Unlike in other postwar periods, the US did not dismantle its military strength.

The US had repeatedly slashed its post-World War II force. On the eve of the Korean War, which erupted June 25, 1950, its size had bottomed out at fewer than 1.5 million airmen, soldiers, sailors, and Marines. The Communist attack jolted the US into a new buildup. Within a year, America had 3.3 million troops under arms, and the wartime force peaked in 1953 at more than 3.6 million. Between the end of the Korean War in 1953 and the start of the Vietnam War buildup in 1965, US end strength never fell below 2.5 million and averaged 2.8 million in any given year.

Under Eisenhower, however, there was to be a major re-examination of



Early in his presidency, Dwight Eisenhower speaks with Boeing officials and members of his Cabinet after inspecting the YB-52 prototype of the B-52 bomber. To his left are George Humphrey, secretary of the treasury, and Harold Talbot, Secretary of the Air Force. Eisenhower's "New Look" defense policy bolstered the airpower cause and placed more emphasis on Strategic Air Command.

the parts, balance, and composition of this force. The emphasis would be on countering Soviet power and general war. Korea had generated a strong distaste for regional conflict.

Investing in Airpower

The result of the Eisenhower review was the emergence of a deeper dependence on nuclear weapons and long-range airpower to deter war. Eisenhower chose not to maintain all of the very large Army and Navy that had fought the Korean War. He chose, rather, to invest more heavily in airpower, especially Strategic Air Command, in large part because that kind of defense could be built for lower cost. The planned USAF buildup to 143 wings had been imperiled by the Truman Administration's final fiscal plan, which provided USAF less money than expected.

By Herman S. Wolk

Gen. Hoyt S. Vandenberg, Air Force Chief of Staff, argued that the proposed funding would support only 79 wings.

“Once again the growth of American airpower is threatened with start-and-stop planning and at a time when we face an enemy who has more modern jet fighters than we have and enough long-range bombers to attack this country in a sudden all-out effort. Rather than reduce our efforts to attain air superiority, we should now increase those efforts,” said Vandenberg.

In 1953, the experience of the Korean War was uppermost in the minds of Eisenhower Administration officials. Coming on the heels of World War II, this first conflict of the nuclear era was enormously unpopular with the American public.

American policy-makers had little doubt that the Soviet Union was behind the war and that it might well consider making a move in western Europe. The idea that the Soviet Union could tie down US forces in out-of-the-way locales fueled immense frustration in Washington. Moreover, the fact that the Russians now possessed nuclear weapons gave impetus to the US military buildup that Truman had launched in mid-1950.

The New Look evolved throughout 1953 and was geared to stave off an open-ended commitment of US forces worldwide, one that could drain the nation’s resources. The idea was that the US would be the one to decide how and where any future wars would be fought. Here was a strategy that, in the words of Secretary of State John Foster Dulles, would allow the nation to retaliate against Communist aggression “by means and at places of our own choosing.”

The emphasis was to be on nuclear deterrence. The way to keep the peace was to persuade a potential enemy not to start a war. This shift in emphasis from land and sea power to airpower also owed a great deal to the Administration’s fiscal conservatism, meaning the desire to maintain a balanced federal budget and lower tax rates.

In the early 1950s, the Joint Chiefs of Staff developed the view that hostility between the West and the Soviet Union would continue indefinitely and that, consequently, a



The B-47 Stratojet could carry either conventional or nuclear bombs. It was a major element in the New Look policy, which called for a national airpower force superior to that of any other nation in the world.

reliance on airpower was appropriate.

In June 1952, the Air Force Council, representing the top echelon of the Air Staff, took a position officially supporting long-range airpower as the major deterrent to Soviet military power. In the summer of 1952, Secretary of the Air Force Thomas K. Finletter, Gen. Nathan F. Twining, vice chief of staff (in lieu of Vandenberg, who was recuperating from cancer surgery), Roswell L. Gilpatric, undersecretary of the Air Force, and Lt. Gen. Laurence S. Kuter, deputy chief of staff for personnel, convened at Finletter’s home in Bar Harbor, Maine, where they discussed future Air Force strategy.

“The New Phase”

These officials drafted a paper titled, “The New Phase,” which referred to preparations to initiate the 143-wing program. For the New Phase, the conferees proposed the establishment of a standing nuclear deterrent force. Subsequently, the Air Staff recommended that the JCS make a request to NATO’s Standing Group to designate the strategic air offensive as a crucial function of NATO strategy.

After the November 1952 election, Eisenhower left for a trip to Korea. He took along Charles E. Wilson, who was to become the next Secretary of Defense, and linked up on Iwo Jima with Adm. Arthur W. Radford, who was to become JCS

Chairman. After a tour of the war theater, the group headed home aboard USS *Helena*. Secretary of State-designate John Foster Dulles and George M. Humphrey, soon to become secretary of the treasury, came aboard at Guam.

At this meeting, Eisenhower emphasized that the United States needed to maintain a strong defense posture that would see to the security of the nation “for the long haul” while also staying within the bounds of fiscal prudence. Radford said US forces were overextended, especially in Asia; he called for the creation of a “mobile strategic reserve” of US conventional forces whose prime purpose would be to back up local, indigenous allies in regional wars. Dulles, for his part, was in favor of building up massive strategic nuclear retaliatory power capable of striking at the sources of Communist power.

This rudimentary New Look military policy evolved considerably in the summer of 1953. The Administration undertook Project Solarium, crafted by the top echelon of the Eisenhower team during a series of secretive meetings (held in the White House solarium). In June, military and civilian officials conferred at the National War College and the incoming JCS team also met to discuss policy options. It was no secret that the Administration was committed, as Eisenhower emphasized, “to make a completely new, fresh

survey of our military capability, in the light of our global commitments.”

In July, Eisenhower directed Wilson to get the Chiefs working on a comprehensive defense review. This reassessment, the President emphasized, should include strategic concepts and implementing plans, roles and missions, composition of forces, readiness of forces, development of new weapons, the resulting advances in tactics, and foreign military assistance programs.

Eisenhower declared, “I have in mind elimination of overlapping in operations and administration and the urgent need for a really austere basis in military preparations and operations.” The President wanted to provide guidance to the National Security Council so as “to ensure the defense of our country for the long haul.”

Contentious Days

The bureaucratic foundation of the New Look was soon laid down in NSC 162/2, a document approved by Eisenhower on Oct. 30, 1953. However, high-level meetings leading to the final approval of that document had been marked by contentiousness.

The man chosen by Eisenhower as the new Chief of Naval Operations, Adm. Robert B. Carney, opposed the plan. So did the new Army Chief of Staff, Gen. Matthew B. Ridgway. These service leaders and others perceived the new document to be a har-

binger of decreasing missions and force structures for their own services.

Eisenhower insisted that the new emphasis on strategic retaliatory power did not mean a diminution of the importance of other missions and forces, particularly those of the Army and Navy. Moreover, the President noted, the new program could not be put into place quickly. It would take time.

On one thing, however, the President was firm, and he said it in this way: “No deterrent to war could compare in importance with this [strategic nuclear] retaliatory striking power.”

Dulles agreed that it would take many years to fully implement the significant changes in policy and force structure that would be required by the New Look, but he added, “If we do not decide now on this change, no change will ever occur.”

NSC 162/2, taking into account the scope and magnitude of the Soviet military threat, stated, “The United States must meet the necessary costs of the policies essential for its security.” Since the outbreak of war in Korea, a coalition of allies, with US help, had deterred additional Communist aggression. The North Atlantic Treaty Organization now maintained sufficient strength to make a Soviet move against western Europe costly. However, the strategic retaliatory power of the United States remained the major deterrent.

“The risk of Soviet aggression,” said NSC 162/2, “will be minimized

by maintaining a strong security posture, with emphasis on adequate offensive retaliatory strength and defensive strength. This must be based on massive atomic capability including necessary bases; an integrated and effective continental defensive system; ready forces of the United States and its allies suitably deployed and adequate to deter or initially counter aggression and to discharge required initial tasks in the event of a general war; and an adequate mobilization base; all supported by the determined spirit of the US people.”

This stated objective posture marked a significant change from the post-World War II containment doctrine which emphasized countermoves against Soviet power at the place of aggression. Deterrence and retaliation were at the heart of the New Look strategy, and it would hinge upon strategic nuclear weapons and continental defense. Naval power also would have a prominent place. Ground forces were to play a less-prominent role. In the wake of the Korean War, the New Look postulated that, in limited wars overseas, the United States would depend on allies to provide most ground forces, in addition to bases for American airpower and expeditionary forces.

Eisenhower's Threat

Despite the unease in some quarters, the Joint Chiefs on Dec. 9, 1953, formally declared that “policies stated in NSC 162/2 will adequately provide for the security of the US.” At about the same time, Eisenhower asserted that it was his firm intention to dispatch SAC nuclear retaliatory forces “immediately upon trustworthy evidence of a general attack against the West.”

Meanwhile, SAC was building up to a force unmatched in striking power. By the close of 1953, SAC had fully equipped 11 of the 17 wings in the atomic strike force. The bomber force included 329 B-47s and 185 B-36s. These aircraft were supported by 137 RB-136s, 500 tankers, and more than 200 fighters. Strategic Air Command personnel numbered almost 160,000 at 29 Stateside and 10 overseas bases.

In December 1953, Radford, the new Chairman of the Joint Chiefs, stated that the new defense policy was crafted for the “long pull, not a year of crisis.” The United States,



Gen. Nathan Twining is sworn in as Chief of Staff by Secretary of the Air Force Talbott in 1953. Looking on are (left to right) Col. K.E. Thiebaud, air adjutant general, and USAF's just-retired CSAF, Gen. Hoyt Vandenberg. Twining in 1952 argued for creation of a standing nuclear deterrent force.

Radford said, "must be ready for tremendous, vast, retaliatory, and counteroffensive blows in the event of a global war, and we must be ready for lesser military actions short of an all-out war."

By late 1953, Radford had become convinced that the top priority should be accorded to airpower. The nation should give its strongest effort, he said, to "the creation, the maintenance, and the exploitation of modern airpower—offensively, defensively, and in support of other forces." Airpower, he said, "is a primary requirement."

On Jan. 12, 1954, Dulles gave public definition to the Administration's New Look. His "Massive Retaliation" speech, delivered to the Council on Foreign Relations in New York, warned that the Soviet Union planned "gradually to divide and weaken the free nations by overextending them." It was important not to exhaust the armed forces in numerous military actions.

Dulles argued that the unclear US security policies in previous years meant US military leaders "could not be selective" in building American forces.

"If an enemy could pick his time and place and method of warfare," said the secretary of state, "and if our policy was to remain the traditional one of meeting aggression by direct and local opposition, then we needed to be ready to fight in the Arctic and in the tropics; in Asia, the Near East and in Europe; by sea, by land, and by air; with old weapons and with new weapons."

Security—At Reasonable Prices

No local defense, Dulles maintained, could, by itself, contain Communist land forces. Consequently, the Administration would "depend primarily upon a great capacity to retaliate instantly, by means and at places of our choosing. ... Instead of having to try to be ready to meet the enemy's many choices, ... it is now possible to get, and share, more basic security at less cost."

Dulles believed that Korea offered an example for the future. There, he said, a cease-fire had been negoti-



Charles Wilson, Secretary of Defense and Adm. Arthur Radford, Chairman of the Joint Chiefs of Staff (shown here in 1955), were instrumental in crafting the New Look strategy. Radford, especially, was an airpower advocate.

ated "on honorable terms." It was possible to do this, he went on, because the enemy in early 1953 "faced the possibility that the fighting might, to his own great peril, soon spread beyond the limits and methods which he had selected." The Communists had been warned that now a response to aggression "would not necessarily be confined to Korea."

Dulles figured that in the long run, strategic nuclear deterrence offered the best way for the United States to deal with the threat of Communist aggression. His formulation was this: "Local defenses must be reinforced by the further deterrent of massive retaliatory power." And President Eisenhower emphasized: "We shall not be aggressors, but we and our allies have and will maintain a massive capability to strike back." This pronouncement was aimed directly at the Soviet Union and China.

As a concept, "massive retaliation" was not entirely new. The buildup in strategic airpower since 1950 and the evolution of the "Air Concept" had been obscured by the fighting in Korea and the periodic calls for "balanced forces." Moreover, Dulles's communication to China via New Delhi—intimating a potential use of nuclear weapons by

the US—certainly foreshadowed the massive retaliation speech.

The Korean War finale, with its implied American threat to employ atomic weapons—propelled the United States into an era of strategic nuclear deterrence. The Dulles doctrine of massive retaliation solidified the Air Force as the lead service in the New Look defense policy.

President Eisenhower himself sketched the contours of the New Look doctrine, and he said the mission of the military was to "get ready and stay ready." It was, he added, a kind of "floating D-Day" strategy.

JCS Chairman Radford, who since the 1949 B-36 hearings and the Revolt of the Admirals had turned himself into an airpower apostle, in late 1953 stated: "This nation will maintain a national airpower superior to that of any other nation in the world."

Twining, who had succeeded Vandenberg as Air Force Chief of Staff, described the New Look as a strategy of "preparedness for general war, should one occur, and maintenance of the capability to cope with lesser situations."

And Gen. Thomas D. White, Air Force vice chief of staff, noting that airpower took advantage of the nation's technical skill, emphasized that with its ability to deliver nuclear weapons, the Air Force "had been recognized as an instrument of national policy."

Korea may have militarized the Cold War, but the New Look launched the US fully into it. ■

Herman S. Wolk is senior historian in the Air Force History Support Office. He is the author of The Struggle for Air Force Independence, 1943-1947 (1997) and a coauthor of Winged Shield, Winged Sword: A History of the United States Air Force (1997). His most recent article for Air Force Magazine, "Decision at Casablanca," appeared in the January issue.

Combat search and rescue soon will be part of the special operations world.

CSAR, Under New Management

By Adam J. Hebert, Senior Editor

THE Air Force has found a new home for its vital combat search and rescue mission. At present, most of the forces, equipment, and oversight of CSAR belong to Air Combat Command. However, service leaders have concluded that the mission fits better in the world of special operations. On

An HH-60 departs Tallil Air Base, Iraq, after depositing a pararescuer.

USAF photo by SSGT. Shane A. Cuomo

Oct. 1, the mission passes to Air Force Special Operations Command.

Air Force leaders believe the move will strengthen CSAR operations, make them more efficient, and raise their profile by putting them in a smaller organization.

The idea of shifting search and rescue out of ACC had been studied for more than a year. Ultimately, the Air Force concluded that the “synergies” to be achieved with the move outweighed any negative factors, ACC commander Gen. Hal M. Hornburg told *Air Force Magazine*.

“Better for the community overall” is how Hornburg described the outcome of the transfer.

The move brings together, under one command, most of the equipment and personnel needed to perform rescues and puts them in close proximity to commandos, some of whom perform similar types of missions.

AFSOC already has search and rescue as a secondary mission, with special ops units filling in when dedicated CSAR forces are not available. This tends to happen a lot, as search and rescue capabilities are among the most heavily tasked in the Air Force.

Commanders frequently seek the ability to recover combat personnel trapped in enemy territory. In Iraq, CSAR was heavily used and highly successful, according to a report by Lt. Gen. T. Michael Moseley, the Gulf War II air commander.

According to Moseley’s “By the Numbers” assessment of the air campaign, Operation Iraqi Freedom’s joint search and rescue center was the largest JSRC ever, and it assisted in 20 rescues, saving 73 personnel.

Falling Short

Twice in recent years, search and rescue limitations complicated combat operations, however.

In 1999, Gen. John P. Jumper, now Air Force Chief of Staff, commanded United States Air Forces in Europe. He said that USAF “acutely

felt” the lack of a permanent CSAR presence in Europe during Operation Allied Force, the air war over Kosovo. The successful rescues of downed F-16 and F-117 pilots during that conflict were achieved by special operations forces, not dedicated rescue assets.

USAFE has since stationed a CSAR unit at NAS Keflavik, Iceland. The CSAR units assigned to the Pacific Air Forces and USAFE will remain in those commands.

More recently, ACC’s CSAR units were slow to arrive in Afghanistan



USAF photo by MSgt. Val Gempis

AFSOC has already planned to modify its MC-130H Combat Talon II airlifters, such as this one, to provide much needed additional capability to aerial refuel CSAR helicopters.



USAF photo by SSgt. Shane A. Cuomo

CSAR at work: An A-10 pilot shot down near Baghdad returns to base accompanied by his heavily armed rescuers. This was one of 20 successful recoveries for Iraqi Freedom’s joint search and rescue center.

in 2001 for Operation Enduring Freedom. The need for AFSOC to fill in led to the successful push for change. In an interview, Lt. Gen. Paul V. Hester, AFSOC commander, said getting CSAR into position around Afghanistan was the final preparatory step to be completed. The initial rescue presence was provided by special operations forces trained to perform rescues as a “tangential mission,” Hester said.

It took a month for ACC’s search and rescue units to fully assume the Enduring Freedom CSAR mission, officials said.

It is hoped the change in oversight will bring an end to these types of situations.

Hester said AFSOC will look for ways to get US-based rescue forces to the combat theaters faster, but that the timing problem will not van-

AFSOC will soon possess two aging helicopters frequently used for rescues. Like the HH-60, the MH-53 (pictured) is due for replacement. The Air Force is developing the CV-22 tilt-rotor as successor to the MH-53 Pave Low and favors a medium-lift, conventional helicopter as a Pave Hawk successor.



ish on Oct. 1 when the changeover occurs. If the problems involved in getting assets deployed were easy to solve, he noted, "ACC would have solved them already."

Officials say the move will also broaden career opportunities. With related missions aligned under AFSOC, there will be more leadership opportunities for rescuers and helicopter crewmen, Hester said. This will create a much broader leadership path for CSAR members, because the rescue mission will not be an afterthought in AFSOC as it was in ACC.

There will be a need to update training operations, said Hester. AFSOC will work with Air Education and Training Command to determine how search and rescue training should be integrated with the training regimes of conventional commandos, he said.

AFSOC will be given control of Moody AFB, Ga., a former fighter facility currently operated by ACC. The 347th Rescue Wing, which has HH-60s and the HC-130s used for CSAR refueling, is the host wing at Moody and will transfer to AFSOC.

The CSAR switch will affect about 9,000 Air Force members. Only a few, however, will be changing lo-

cations. Hester said most people affected will simply change patches. The change includes shifting:

- 91 positions to Davis-Monthan AFB, Ariz.
- 53 positions to Hurlburt Field, Fla.
- 31 positions to Nellis AFB, Nev.

According to Hester, the Air Force realignment had no connection with the Pentagon's decision this year to increase the size and authority of US Special Operations Command. The CSAR units will continue to be organized, trained, and equipped as Air Force rescue assets and will not belong to SOCOM.

Long in Flux

Combat search and rescue had been in flux for years. There had been discussions about moving CSAR out of ACC throughout the 1990s, but the right time never seemed to arrive.

Officials had been debating the proper home for CSAR since at least 1990, when AFSOC was created out of the former 23rd Air Force in a move to increase the role of special operations.

More recently, the Air Force has carried out various administrative

changes to better CSAR's lot within the Air Combat Command structure. These included moving Air Force Reserve Command rescue equipment in Oregon to an active duty unit at Davis-Monthan, a change that will be completed later this year. (The AFRC unit is switching from a CSAR to an aerial refueling mission.)

Officials approved a service life extension program for the oldest of the HH-60 Pave Hawks to ensure they remain workable until a next generation recovery vehicle becomes available around 2010. And the size of the HC-130 refueling fleet is being increased through the conversion of 10 WC-130s to the tanker configuration. These conversions should be complete by 2006.

A recent ACC study recommended replacing the 105 lightweight HH-60s used for CSAR with 132 medium-lift helicopters. Use of the new helicopters will not only improve aircraft availability but also address several HH-60 deficiencies such as limited range and small payload.

For the time being, however, AFSOC will have possession of two aging rotorcraft platforms that are due for replacement. In addition to the HH-60s, the MH-53 Pave Lows used to transport commandos are also aging out. The Air Force backs separate programs to replace those aircraft, given the different missions the Pave Hawks and Pave Lows are asked to perform.

The V-22 tilt-rotor that is expected to replace the MH-53 was also considered for the CSAR mission, but was passed over in favor of a more traditional, medium-lift replacement for the HH-60. Hester noted that the study recommendation calls for an "off the shelf" purchase, unlike the ground-up development and acquisition of the V-22.

In spite of the recent and planned changes, CSAR remained an overstressed, overtasked mission area that was never able to get to the top of ACC's list of priorities.

Hornburg acknowledged that, over the years, ACC did "a less than adequate job" of budgeting for CSAR, even though ACC units are most in need of rescue support. After all, pilots in the combat air forces are in danger of going down in enemy territory almost every time they perform a wartime mission. ■



**Air Force
Association**

2003 National Convention

“Up From Kitty Hawk: 100th Anniversary of Powered Flight”

**Marriott Wardman
Park Hotel
Washington, D.C.
Sept. 13-17, 2003**

The 2003 Air Force Association National Convention will be a historic gathering of leaders from government, the Department of Defense, and the aerospace industry. In conjunction with the convention, the US Air Force will host a Global Air Chiefs Conference with an estimated 100 Air Chiefs from around the world attending.

The AFA National Convention will feature:

- Salute to the Air Force's 12 Outstanding Airmen
- International Airpower Symposium
- Black-tie dinner commemorating the 56th anniversary of the Air Force, as well as the 100th anniversary of powered flight.
- Tribute to technology and aviation heroes over the past 100 years
- Presentation of AFA awards, including our highest awards to civilian, industrial, and military leaders
- Aerospace Technology Exposition—with more than 52,000 square feet of the very latest in aerospace technology from companies all over the world for hands-on review. Exhibit space is still available. For information, call Pat Teevan at 703-247-5836

Convention headquarters hotel is the Marriott Wardman Park Hotel in Washington, D.C., 202-328-2000. Housing is also available by calling Accommodations for Washington, D.C., at 1-800-554-2220.

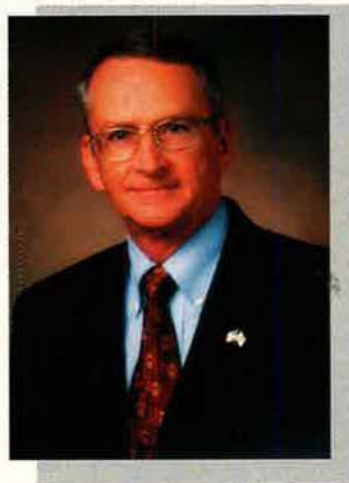
For further information on both the AFA National Convention and the Aerospace Technology Exposition, or to register online, visit the AFA Web site at www.afa.org



AFA Nominees for 2003-04



Politi



Condon



Kemp



Rader



Nelson

THE Air Force Association Nominating Committee, which consists of the five most recent past National Presidents (not serving as Chairman of the Board) and one representative from each of the 14 US regions, met in Dallas on April 25 and selected a slate of candidates for the four national officer positions and six elective positions on the Board of Directors. This slate will be presented to the delegates at the National Con-

vention in Washington, D.C., in September.

John J. Politi of Sedalia, Mo., was nominated for his second one-year term as Chairman of the Board. He formerly served as AFA National President, National Director, National Vice President for the Midwest Region, Missouri State President, and Chairman of the Audit, Membership, and Ad Hoc Financial Committees. Among his many awards,

Politi has received the AFA Presidential Citation, the Exceptional Service Award, and the Medal of Merit.

Politi was commissioned through the AFROTC program and entered the Air Force in March 1966 at Ellsworth Air Force Base in South Dakota. A veteran of 26 years, Politi spent the majority of his Air Force career in strategic nuclear weapons systems. He commanded an air divi-

sion and two wings and served on both the Joint Staff and the Air Staff. He retired as a colonel in 1992. A well-decorated officer, Politi has received, among other awards, the Legion of Merit and the Defense Meritorious Service Medal.

Currently, Politi is the President of the Excellence in Missouri Foundation, a nonprofit, private sector education organization. He is a graduate of the University of Colorado with a bachelor of arts degree in political science and of South Dakota State University with a master of science degree in economics. He is married to the former Terri Hatch and has five children, Pam, Eileen, Jay, Stephanie, and Chip.

Stephen P. "Pat" Condon of Ogden, Utah, was nominated for his second one-year term as National President. He formerly served as an AFA National Director, Northern Utah Chapter President, Chairman of AFA Focus on Defense Symposium, Chairman of the Constitution Committee, and member of both the AFA Executive and Resolutions Committees. Among his many awards, Condon has received the AFA Medal of Merit, the Utah State AFA Presidential Citation, and Program of the Year Award.

Condon joined the Air Force in August 1964 at Wright-Patterson Air Force Base in Ohio. A veteran of 33 years, Condon spent the majority of his career in Air Force science and technology, research and development, acquisition, test, and logistics support. He commanded the Air Force Armament Laboratory, Arnold Engineering Development Center, and Ogden Air Logistics Center and served at the NASA Manned Spacecraft Center. Additionally, he was the Deputy Assistant Secretary, Management Policy and Program Integration, in the Office of the Assistant Secretary of the Air Force for Acquisition. Condon retired as a major general in 1997. A well-decorated officer, Condon has received many awards, including the Defense Distinguished Service Medal, the Legion of Merit, and the Defense Meritorious Service Medal.

Currently, Condon is an aerospace consultant and senior associate at Dayton Aerospace, Inc., Dayton, Ohio. He is a graduate of the University of Oklahoma with a bachelor of science degree in mechanical engi-

neering; the Air Force Institute of Technology with a master of science degree in aerospace-mechanical engineering; and the University of Texas at Austin with a doctorate in aerospace engineering.

He is active in several community and charitable organizations. Condon is married to the former Judy Smothermon, and they have two children, Susan and Michael.

The Nominating Committee is submitting two names for consideration for a one-year term as National Secretary:

Thomas J. Kemp of Fort Worth, Tex., joined AFA in December 1964 and became a Life Member in 1982. He currently serves as an AFA National Director and has been a member of AFA's Audit, Executive, Finance, Membership, and Resolutions Committees. Kemp has also served as Texoma Region President, Texas State President and Vice President, and Fort Worth Chapter President. He has received personal recognition as AFA's Member of the Year in 2002 and as Texas State Member of the Year. He received AFA's Presidential Citation in 2000, Exceptional Service Awards in 1990, 1991, 1994, and a Medal of Merit in 1987. He also has received the Oklahoma State Medal of Merit.

Kemp was commissioned in the Air Force in December 1964 and was trained as both a navigator and a pilot. His 20-year career included service in the C-130, C-141, OV-10, and B-52 and increasingly responsible staff positions in plans, operations, and training. Following retirement he has done work in instructional systems and course-work design and most recently worked on development of bar code sorters for the US Postal Service as Manager of Integrated Logistics Support for Siemens ElectroCom. He is a graduate of Loras College in Iowa with a bachelor of arts in business (accounting) and a master's degree in systems management from St. Mary's University in San Antonio.

He and his wife Ruth have four children.

Coleman Rader Jr. of Maple Grove, Minn., joined AFA in March 1992 and currently serves as an AFA National Director and Aerospace Education Foundation Trustee and is a member of the Nominating, Finance, and Ad Hoc Committees. He

has served as Minnesota State President (four terms) and Vice President and as President and Vice President of the Gen. E.W. Rawlings Chapter. He received AFA's Exceptional Service Award in 2002 and a Medal of Merit in 1993 and was named an Ira Eaker Fellow of AEF.

Rader began his 20-year Air Force career in the enlisted ranks. He was later commissioned and received his pilot wings, serving in Southeast Asia. He also served as Command and Control Officer for the Strategic Air Command underground command post. He earned numerous medals, awards, and unit citations during his career. After retirement, he became active in civilian aviation, directing the flight group for AT&T operations in the Minneapolis-St. Paul, Minn., area. Rader has flown 17 Air Force and 10 corporate aircraft, logging more than 23,000 flying hours.

His volunteer activities include serving as President of the Minnesota Golden Eagles (mentoring youth in aviation) and as a Co-Chair of the Red Tail Project (restoration of a P-51C Mustang in honor of the Tuskegee Airmen). He is also involved in Civil Air Patrol, Youth Motivation Task Force, and NAACP. He has been inducted into the Black Aviation Hall of Fame.

He is married to the former Emily M. Mitchell. They have two daughters and four grandchildren.

Charles A. "Chuck" Nelson of Sioux Falls, S.D., was nominated for a fourth one-year term as National Treasurer. A Life Member of AFA, Nelson has served as North Central Region President, South Dakota State President, and Dacotah Chapter President. Nationally, he has been active since 1989, serving on the Junior Officer Advisory Council, Air National Guard Council, Membership Committee, Finance Committee, and as an Under-40 National Director. Most recently he has served as Chairman of the Audit Committee. Nelson was awarded AFA's Medal of Merit in both 1991 and 1998.

In 1980, Nelson enlisted in the South Dakota Air National Guard. He was commissioned a second lieutenant in July 1984 and promoted to the rank of major in 1993. He retired from the South Dakota ANG in April 1995. Nelson's military awards in-



Shepherd



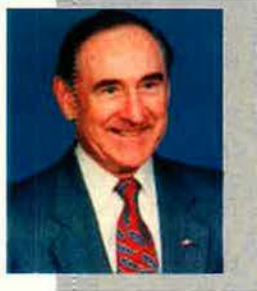
Taubinger



Seavers



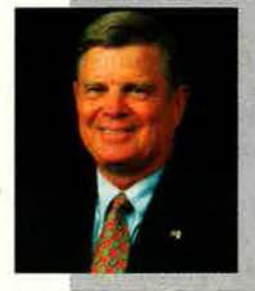
Sutton



Heth



Allen



Peters

clude Outstanding Lieutenant for the South Dakota ANG (1987), Junior Officer of the Year (1987), Air Force Commendation Medal (1992), and the Air Force Meritorious Service Medal (1995).

Nelson is a certified public accountant and is employed as a managing partner for Nelson & Nelson CPAs L.L.P., in Sioux Falls. He is past President of the Gloria Dei Lutheran Church and has previously served as their Treasurer and Chairman of the Board of Administration. He also serves as Secretary and Treasurer of the South Dakota Air Show, Inc., and is a past President of the Sioux Falls Downtown Lions Club.

He is married to the former Kristine Christensen, and they have three daughters, Rebecca, Jillian, and Sarah.

The AFA Constitution directs that one-third of the 18 elected Directors be elected at the National Convention each year. For the 2003 election, the Central East, Far West, North Central, Rocky Mountain, and Texoma Regions have Director positions open, and there is one

Director position open to be elected at large.

The nominees for Director to be chosen by their regions are:

Central East: **Thomas G. Shepherd**, Virginia. Central East Region President. Former Virginia State President and Vice President, Northern Shenandoah Valley Chapter President, and member of the AFA Veterans/Retiree Council.

Far West: **Richard C. Taubinger**, California. Former Far West Region President, California AFA Chairman of the Board, California State President and Vice President, Sacramento Chapter President, and member of the AFA Veterans/Retiree Council.

North Central: **Victor Seavers**, Minnesota. Former National Director, North Central Region Vice President, Minnesota State President, Gen. E.W. Rawlings Chapter President and Vice President, member of the AFA Executive Committee, and Chairman of the AFA 2010 Committee.

Rocky Mountain: **Brad Sutton**, Utah. Former Utah State President and Vice President and Ute-Rocky Mountain Chapter President. Mem-

ber of the AFA Membership Committee.

Texoma: **M.N. "Dan" Heth**, Texas. Former Texoma Region President, Texas State President and Vice President, Fort Worth Chapter President, and member of the AFA Veterans/Retiree Council, the Long-Range Planning, Audit, and Membership Committees.

The Nominating Committee is submitting two names for consideration for the office of National Director At Large:

Craig E. Allen, Utah. Rocky Mountain Region President. Former Utah State President, Vice President, and Treasurer and Northern Utah Chapter President. Member of the AFA Long-Range Planning Committee and former member of Credential and Membership Committees.

Michael J. Peters, California. Far West Region President. Former California State Vice President and Brig. Gen. Robert F. Travis Chapter President and Vice President. Member (and former Chairman) of the Reserve Council and former member of the Long-Range Planning Committee. ■



NATIONAL OFFICERS



BOARD CHAIRMAN

John J. Politi
Sedalia, Mo.



PRESIDENT

Stephen P. "Pat" Condon
Ogden, Utah



SECRETARY

Daniel C. Hendrickson
Layton, Utah



TREASURER

Charles A. Nelson
Sioux Falls, S.D.

NATIONAL DIRECTORS

L. Boyd Anderson
Ogden, Utah

Roy A. Boudreaux
Venice, Fla.

Billy M. Boyd
Carthage, Miss.

John H. Breslin
Miami

Kathleen Clemence
Reno, Nev.

John E. Craig II
Arlington, Va.

David R. Cummock
Daytona Beach, Fla.

Eugene M. D'Andrea
Warwick, R.I.

Dennis R. Davoren
Beale AFB, Calif.

Frederick J. Finch
Waldorf, Md.

W. Ron Goerges
Fairborn, Ohio

Richard B. Goetze Jr.
Arlington, Va.

Richard E. Hawley
Newport News, Va.

Stanley V. Hood
Columbia, S.C.

Sam Johnson
Washington, D.C.

Thomas J. Kemp
Fort Worth, Tex.

John Lee
Salem, Ore.

Thomas J. McKee
Fairfax Station, Va.

Brian McLaughlin
Bonaire, Ga.

John C. Moore
Dallas

Lloyd W. Newton
Avon, Conn.

Robert E. Patterson
Shalimar, Fla.

Julie E. Petrina
Baltimore

Coleman Rader Jr.
Maple Grove, Minn.

Robert C. Rutledge
Johnstown, Pa.

Michael E. Ryan
Arlington, Va.

Ronald E. Thompson
Xenia, Ohio

Arthur F. Trost
Walnut Creek, Calif.

Howard R. Vasina
Colorado Springs, Colo.

Edward I. Wexler
Savannah, Ga.

Warren E. White
Minneapolis, Minn.

Robert M. Williams
Omaha, Neb.

DIRECTORS EMERITUS

John R. Alison
Washington, D.C.

Joseph E. Assaf
Sandwich, Mass.

Richard H. Becker
Oak Brook, Ill.

David L. Blankenship
Tulsa, Okla.

John G. Brosky
Pittsburgh

Dan Callahan
Centerville, Ga.

Robert L. Carr
Pittsburgh

George H. Chabbott
Dover, Del.

O.R. "Ollie" Crawford
Blanco, Tex.

R.L. Devoucoux
Portsmouth, N.H.

Jon R. Donnelly
Richmond, Va.

Russell E. Dougherty
Arlington, Va.

George M. Douglas
Colorado Springs, Colo.

Charles G. Durazo
McLean, Va.

Joseph R. Falcone
Ellington, Conn.

E.F. "Sandy" Faust
San Antonio

John O. Gray
Arlington, Va.

Jack B. Gross
Harrisburg, Pa.

Martin H. Harris
Montverde, Fla.

Gerald V. Hasler
Encinitas, Calif.

Monroe W. Hatch Jr.
Clifton, Va.

H.B. Henderson
Santa Ana, Calif.

John P. Henebry
Winnetka, Ill.

David C. Jones
Arlington, Va.

Victor R. Kregel
Colorado Springs, Colo.

Jan M. Laitos
Rapid City, S.D.

Nathan H. Mazer
Roy, Utah

William V. McBride
San Antonio

James M. McCoy
Bellevue, Neb.

Bryan L. Murphy Jr.
Fort Worth, Tex.

Ellis T. Nottingham
Washington, D.C.

Jack C. Price
Pleasant View, Utah

William C. Rapp
Williamsville, N.Y.

Walter E. Scott
Dixon, Calif.

Mary Ann Seibel-Porto
St. Louis

John A. Shaud
Springfield, Va.

Joe L. Shosid
Fort Worth, Tex.

James E. "Red" Smith
Princeton, N.C.

R.E. "Gene" Smith
West Point, Miss.

William W. Spruance
Marathon, Fla.

Harold C. Stuart
Jensen Beach, Fla.

Walter G. Vartan
Chicago

A.A. West
Hayes, Va.

Sherman W. Wilkins
Issaquah, Wash.

Joseph A. Zaranka
Bloomfield, Conn.

EX OFFICIO

Donald L. Peterson
Executive Director
Air Force Association
Arlington, Va.

Donald J. Harlin
National Chaplain
Albuquerque, N.M.

Matthew J. Steele
National Commander
Arnold Air Society
Pullman, Wash.

By Frances McKenney, Assistant Managing Editor

A Library for Red

When the library at Gunter Annex, Ala., was officially named for Medal of Honor recipient MSgt. Henry E. "Red" Erwin, his widow, Betty, unveiled a bronze wall plaque that commemorated his heroism in World War II. The Air Force Association had donated the funds for the plaque, and it had been presented to the Irwin family by **Montgomery (Ala.) Chapter** President Albert A. Allenback Jr.

On April 12, 1945, then-Staff Sergeant Erwin was a radio operator on a B-29 making a low-level attack on Japan. One of his duties was to drop phosphorus smoke bombs through a chute in the floor, to aid in assembling the group of airplanes at the launching point. A fuse on one bomb malfunctioned, igniting the phosphorus. It burned at 1,300 degrees. The canister blew back up the chute and into Erwin's face, searing off his nose, blinding him, and filling the aircraft with smoke that obscured the pilot's vision. The canister was also in danger of burning through the aircraft's floor and igniting the bomb load below. Erwin picked it up in his bare hands and stumbled through the aircraft to throw it out a window. The smoke cleared, and the pilot pulled the airplane out of a dive at 300 feet.

Erwin survived his severe injuries and later became a benefits counselor at the Veterans Affairs Hospital in Birmingham, Ala. He died in January 2002 in Leeds, Ala., at age 80.

CMSgt. David L. Hamel, director of the Air Force Enlisted Heritage Research Institute and a chapter member, helped Allenback in presenting the bronze plaque to Betty Erwin. Hamel said Red Erwin knew before his death that the library was to be named for him.

Wright Replica

A replica of the 1905 Wright Flyer flew over Nellis AFB, Nev., in late May in a flight sponsored by the **Thunderbird (Nev.) Chapter**, the local Rotary International group, and the Nellis Support Team.

Engineering students and faculty from Utah State University at Logan,



AFA Board Chairman John Politi meets with senior enlisted personnel at Elmendorf AFB, Alaska. Politi received information briefings and conducted AFA outreach activities at Elmendorf and at Eielson Air Force Base in June. He was in Alaska for the AFA State Convention at Fairbanks and Anchorage.

Utah, built the replica airplane—with help from the school's Space Dynamics Laboratory and the Air Force—to commemorate the 100th anniversary of the Wright brothers' flight. After the aircraft's maiden voyage at Wendover, Utah, in March, the group sent it on tour to educate the public on the Wright brothers' achievement and the art of flying.

The visit to Nellis was an initiative of the late Emery S. "Scotty" Wetzel Jr., the Air Force Association national director who died in April.

The audience for the flyover included many local schoolchildren and AFA officials Robert J. Herculson Jr., Nevada state president, Terry Sullivan, state vice president south, and Peter T. Gillespie, state treasurer.

Although it looks like the Wright brothers' 1905 aircraft—which was their third powered aircraft and the first capable of maneuverable sustained flight—the full-scale replica is made of modern materials, such as Kevlar, foam, and fiberglass. Nickel-coated graphite was stained to look like wood. The wings were wrapped in Dacron, rather than the muslin used

by Wilbur and Orville Wright. David P. Widauf, project advisor and an Air Force Reserve colonel, told a USU newspaper, "If the Wright brothers were alive today, they would have used all the technology available and the best materials. That is what we are doing."

Visions Outreach

The **Lincoln (Neb.) Chapter's** vice president for aerospace education, Diane K. Bartels, and AFOTC cadets from the University of Nebraska at Lincoln flew to the Santee Sioux American Indian reservation in April, on what is becoming an annual Visions of Exploration outreach visit.

Visions is sponsored by the Aerospace Education Foundation and *USA Today* newspaper to encourage students in the elementary and middle schools to develop skills in math, science, and technology.

Bartels flew a Piper Cherokee 180 to an airport near the Santee reservation, located on the Nebraska-South Dakota border. On board were Army National Guard Col. Thomas Brewer, who is a Native American,

and Mike Larson, head of flight training at the University of Nebraska at Omaha's aviation institute.

Cadet Ryan Schmid flew a Cessna 172 to Santee, with fellow Lincoln Chapter cadet members Jason R. Thompson and Kent C. Moody on board. The round-trip was a little over 300 miles.

At Santee Community School, Bartels and two of the cadets spoke to youngsters about envisioning and planning for their futures, current events covered in *USA Today*, and the military. Schmid, dressed in a flight suit, and Moody, in an AFROTC uniform, taught the kids about military uniforms, customs, and courtesies and challenged them to push-ups to emphasize the importance of physical fitness.

Meanwhile, Brewer, who is a Black Hawk pilot, Larson, and Thompson visited with older students at the school, talking to them about career choices.

During the 2002-03 school year, 1,417 classrooms in grades four through eight—more than 42,000 students—participated in the Visions of Exploration program. The Lincoln Chapter sponsored nine classrooms, according to AEF.

This was the second time Bartels and UNL cadets made a Visions outreach visit to the Santee reservation. Schmid, who was on the first one last year, thrilled the students again with a flyover of the school, as he and the cadets headed back to Lincoln.

VIP Visit

The **Snake River Valley (Idaho) Chapter** brought astronaut Bonnie J. Dunbar to Mountain Home, Idaho, where she spoke to more than 2,000 people, including school students.

The chapter sponsored Dunbar, a veteran of five shuttle flights, as guest speaker for the 366th Fighter Wing's Airman Leadership School graduation dinner in April. More than 400 guests turned out for the black-tie banquet at the base's Gunfighter Club. Dunbar spoke to them about leadership and her NASA career. (She is now assistant director for university research and affairs at the Johnson Space Center in Houston.)

The next day, she visited Mountain Home High School, where nearly 800 students and teachers gathered for her presentation. At the junior high school, some 600 were in attendance, and at Mountain Home Elementary School, she addressed about 300 youngsters.

That evening, Dunbar spoke at a dinner sponsored by both the chapter and the local Daedalian group.



Norman Fortier of the Pease Chapter makes a point to New Hampshire Gov. Craig Benson (left) and AFA State President Eric Taylor at the unveiling of a plaque honoring the state's USAF personnel. See "Granite State Heroes," p. 94.

Chapter President Donald A. Walbrecht said Dunbar's remarks to these groups covered her personal history—which includes a master's degree and doctorate in engineering and work for Boeing and Rockwell—and her NASA experiences. One highlight she covered was her 13 months at Star City, Russia, in 1994, training as a backup crew member for a flight on the Russian space station Mir.

Dunbar served as a research scientist on the shuttle *Challenger* in November 1985, on *Columbia* in 1990 and 1992, on *Atlantis* in 1995—the first shuttle mission to dock with Mir—and most recently on *Endeavour* in January 1998.

Many chapter members had a hand in the success of the astronaut's visit to Mountain Home. Walbrecht said A1C Jennifer L. Roberts, an AFA member, knew Dunbar through a contact at the University of Washington, where Roberts was in the ROTC program and where Dunbar received her bachelor's and master's degrees.

Chapter member TSgt. Charles M. Ellerby handled Dunbar's appearances at the ALS graduation as well as the local schools. Chapter member Col. (sel.) James P. Molloy took charge of arrangements with the Gunfighter Club. Walbrecht's many roles ranged from sending out invitations to local civic leaders to master of ceremonies to chauffeur. He also credits chapter members Carl W. Olsen and Maj. Matthew A. Stevens in helping the chapter carry out this VIP visit.

Heritage of Eagles

In June, the **Montgomery (Ala.)**

Chapter sponsored its annual luncheon for the aviation and aerospace legends who were in town for Air Command and Staff College's "Gathering of Eagles" symposium.

The Eagles are aviation and aerospace notables that ACSC has been inviting to the school since 1982 to educate and inspire its students.

The living legends at the symposium this year included retired Col. Lee A. Archer, a Tuskegee Airman; retired Army Maj. Gen. Patrick H. Brady, Medal of Honor recipient and helicopter pilot in the Vietnam War; retired Lt. Gen. Devol Brett, 16th Air Force commander; USAF Col. Eileen M. Collins and retired Navy Capt. Robert L. Crippen, both space shuttle commanders; experimental-airplane pilots Scott Crossfield and retired Brig. Gen. Charles E. Yeager; Vietnam War aces US Rep. Randy "Duke" Cunningham (R-Calif.) and retired Col. Charles B. DeBellevue; retired Brig. Gen. David Lee "Tex" Hill, a Flying Tiger and World War II ace; retired Col. Joseph W. Kittinger Jr. and Bertrand Piccard, both record-setting balloonists; retired Col. Walker "Bud" Mahurin, who scored 20.75 aerial victories in World War II and was later a Korean War POW; retired Gen. T. Ross Milton, chief of staff for the Combined Berlin Airlift Task Force; Richard G. Rutan, *Voyager* pilot; and Florene Miller Watson, a Women Airforce Service Pilot (WASP).

Brett, DeBellevue, Hill, Milton, Watson, and Yeager are AFA members, from the **Donald W. Steele Sr. Memorial (Va.) Chapter**, **Central Oklahoma (Gerrity) Chapter**, **Alamo (Tex.) Chapter**, **Tucson (Ariz.) Chapter**,

Panhandle AFA (Tex.) Chapter, and **David J. Price (Calif.) Chapter**, respectively.

At the luncheon, Lt. Gen. Donald A. Lamontagne, Air University commander, thanked all the history-makers for inspiring ACSC students who, he said, will be "the next generation of Eagles."

AFA leaders at the chapter's Eagles luncheon included George P. Cole, South Central Region president; Greg Schumann, outgoing Alabama state president; John T. Wigington III, president of the **Tennessee Valley Chapter**; and Albert A. Allenback Jr., who was elected state president at the Alabama State Convention business meeting after the lunch.

On Parade

In San Antonio in April, the **Alamo (Tex.) Chapter** participated in what is billed as the largest lighted parade in the US. It was the city's 56th annual Fiesta Flambeau Parade, which has an estimated half-million viewers.

The Fiesta Flambeau consists of about 150 floats, bands, and other groups. The vehicles are adorned

with strings of lights as they travel a 2.6-mile route through downtown San Antonio.

The Alamo Chapter's entry involved three Humvees from security forces units at Lackland AFB, Tex.; AFROTC cadets from the University of Texas at San Antonio; and marchers from the chapter and three Civil Air Patrol squadrons. They formed part of the vanguard—an advance party for the main parade. They set out shortly before 7 p.m., an hour before the main parade got under way.

The Fiesta Flambeau caps a nine-day citywide cultural festival, and the parade's historian credits the inclusion of San Antonio's large military community as key to the parade's success. The Alamo Chapter's Fiesta Flambeau entry was organized this year by Eric Renth and SSgt. Michelle C. Jordan.

Granite State Heroes

Names of nine Air Force personnel from New Hampshire have been memorialized on a large bronze plaque that was presented to the state's governor on Memorial Day.

Eric P. Taylor, New Hampshire state

president, and Norman J. Fortier, a World War II ace and **Pease (N.H.) Chapter** member, made the presentation to Gov. Craig Benson at a Memorial Day proclamation signing ceremony in the Executive Chambers of the New Hampshire State House. The plaque will be mounted in the Hall of Flags in the State House.

Heading the list of Granite State 20th century Air Force heroes is Medal of Honor recipient Capt. Harl Pease Jr. He was a bomber pilot from Plymouth, N.H., whose aircraft was downed by enemy fighters as it returned from a bombing run over an airdrome near Rabaul, New Britain, in August 1942.

Also listed are fighter aces Capt. Joseph C. McConnell Jr., USAF's leading ace of the Korean War, and Col. Harrison R. Thyng, who was an ace in both World War II and Korea.

Others listed on the plaque are World War II fighter aces Capts. Frederick E. Dick, Fortier, William A. Gardner, and Harry A. Parker and 1st Lts. Philip Sangermano and Frederick O. Trafton Jr.

Members of Sangermano's family attended the plaque presentation. Along with Fortier, they helped give a more personal dimension to the ceremony, Taylor said. The Order of Daedalians and Military Officers Association of America donated about one-third of the funds for this project.

Air Fair in Orlando

At an AFA booth set up at the Orlando (Fla.) Air Fair in April, a trio of **Central Florida Chapter** members handed out AFA membership applications and a couple hundred back issues of *Air Force Magazine*.

The two-day annual air fair, sponsored by the Experimental Aircraft Association at Orlando Executive Airport, attracted more than 5,000 visitors, said Richard A. Ortega. He is state and chapter VP for aerospace education and manned the AFA booth with Paul G. Hay and Robert Reese Jr.

The three were part of the air fair's planning committee, along with chapter members James Burns, Barbara Walters-Phillips, and Michael Arnold.

In addition to financial support for the event, the chapter provided hands-on help. Ortega wrote the proclamation signed by the Orange County chairman in honor of the event. Walters-Phillips, who received AEF's Christa McAuliffe Memorial Award for Teachers in 1995, supervised vendors, exhibitors, and aerospace education activities.

New AFA Wearables





Order Toll-Free
1-800-727-3337

Please add \$3.95 per order
for shipping and handling

A1 Polo Shirt. 100% combed cotton by Outer Banks. Embroidered "Air Force Association" and logo. Available in dark blue and white. Unisex sizes: M, L, XL, XXL. **\$31**

A2 Denim Shirt. 100% cotton stonewashed with button down collar. Embroidered "Air Force Association" and logo. Unisex sizes: S, M, L, XL, XXL. **\$35**

A3 AFA Cap. 100% cotton pro style 6 panel construction. Embroidered AFA name on front and full-color logo on back panel. Adjustable strap. Dark blue. **\$20**

A4 AFA Sweatshirt. 12 oz. superblend by Lee. Embroidered "Air Force Association" and logo. Unisex sizes: M, L, XL, XXL. **\$30**

A5 Polo Shirt. 100% cotton interlock by Lands' End. Embroidered "Air Force Association" and logo. Available in dark blue and white with contrasting colors on collar and cuffs. Unisex sizes: S, M, L, XL. **\$35**

Arnold, from the University of Central Florida's Det. 159, supervised fellow AFROTC cadets. They escorted youngsters to and from aircraft that took off for more than 300 free rides that weekend. The cadets also supervised the parking of these airplanes.

Special attractions at the air fair were an F-117 flyby, military and civilian aircraft on static display, and flight simulators, games, and activities aimed at interesting youngsters in aviation.

CAP's Role

The **Gen. Bruce K. Holloway (Tenn.) Chapter** sponsored a dinner program at McGhee Tyson Air National Guard Base in May, with the CAP national commander as guest speaker.

CAP Maj. Gen. Richard L. Bowling spoke about the history of the Air Force auxiliary, its operations and organization, recent missions, and how CAP plans to help the Department of Homeland Security carry out its mission—in short, said chapter member Joseph E. Sutter, it was the unclassified version of the briefing that CAP recently delivered to Secretary Tom Ridge. (See "The Citizen Air Fleet," June, p. 76.)

The audience at this program, held at the Armed Forces Club, included members of many other military organizations in the Knoxville area, such as the Navy League and Marine Corps League. Among AFA leaders present were Holloway Chapter President George Vitzthum and Jack K. Westbrook, AFA Member of the Year in 1987.

More AFA/AEF News

Old friends and now fellow members of the **Col. H.M. "Bud" West (Fla.) Chapter**, John E. Schmidt Jr. and Larry D. Wright attended an awards banquet for the AFJROTC unit at Bainbridge High School in Bainbridge, Ga., in May. Schmidt, the chapter secretary and a retired chief master sergeant, presented an AFA Medal to cadet Charles W. Cooksey. Wright, a retired brigadier general, presented a Daedalian Award to cadet Betty J. Brown. Schmidt noted that Wright had been the cadet wing commander at the University of Maryland's Det. 330 in 1960, at the same time Schmidt was a staff sergeant there. They served together again in 1973 at the US Air Force Academy.

The **Panhandle AFA (Tex.) Chapter** awarded its first scholarship to a local graduating AFJROTC cadet. Chapter President Terry Moore and George F. Moore, the chapter AF-

JROTC liaison and scholarship chairman, presented \$250 to Hazel Plexico of Palo Duro High School in Amarillo, Tex. According to George Moore, Plexico will attend Amarillo College this fall to work toward a nursing degree. At the same ceremony, the chapter presented an AFA Medal to Palo Duro cadet Mateo Diaz. ■

Have AFA/AEF News?

Contributions to "AFA/AEF National Report" should be sent to *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Phone: (703) 247-5828. Fax: (703) 247-5855. E-mail: afa-aef@afa.org.

AFA Conventions

- Aug. 15-16 **Illinois State Convention**, Des Plaines, Ill.
- Aug. 15-16 **Utah State Convention**, Ogden, Utah
- Aug. 16 **Georgia State Convention**, Robins AFB, Ga.
- Aug. 22 **Missouri State Convention**, Lake of the Ozarks, Mo.
- Aug. 22-23 **Colorado State Convention**, Colorado Springs, Colo.
- Aug. 22-23 **Michigan State Convention**, Alpena, Mich.
- Sept. 15-17 **AFA National Convention**, Washington, D.C.
- Sept. 28 **New Hampshire State Convention**, Manchester, N.H.

Unit Reunions

reunions@afa.org

9th BW, Mountain Home AFB, ID. Sept. 11-13 in Coeur d'Alene, ID. **Contact:** Bibiana Nertney, 7726 W. Mooserun Ct., Boise, ID 83704 (208-322-5145) (bnertney@uswest.net).

47th BW (TAC). Oct. 15-19 in Tucson, AZ. **Contact:** Charles Palmer, 8641 Augusta Cir., Anchorage, AK 99504-4202 (907-332-0296) (crpalmer@gci.net).

49th FG Assn. Sept. 11-14 in Goldsboro, NC. **Contact:** Ralph Easterling, 3800 Shamrock Dr., Charlotte, NC 28215 (704-532-7259).

52nd FG, 5th FS (WWII). Sept. 21-24 at the Lodge of the Ozarks in Branson, MO. **Contact:** George Angle, 70 Stratford Rd., Wichita, KS 67207 (316-263-1201) (jgangle70@msn.com).

81st FW, including all personnel who served from WWII to inactivation. Oct. 16-19 in Dayton, OH. **Contact:** John Hoye, 1023 Hemlock Ave., Lewiston, ID 83501 (208-746-6155) (jhoyebet@cableone.net).

339th FG, Eighth AF (WWII). Oct. 15-19 at the Airport Marriott in Nashville, TN. **Contact:** Stephen Ananian, 4 N. Orchard Farms Ave., Simpsonville, SC 29681 (864-288-2599) (stephen_ananian@mindspring.com).

388th Fighter-Bomber Wg, Clovis AFB, NM, and Etain AB, France (1953-58). Oct. 9-12 in St. Louis. **Contact:** Jim St. Clair, 1117 Cambridge Green Ct., Chesterfield, MO 63017 (636-530-5996) (jimstc@swbell.net).

479th FG, 435th FS. Oct. 16-19 at Moody AFB, GA. **Contact:** Capt. Russell Garner (DSN 460-8435 or 229-257-8435) (russell.garner@moody.af.mil).

B-1 aviators. Aug. 14-16 at Dyess AFB, TX. **Contact:** Rodman (DSN 461-3775 or 325-696-3775) (todd.serres@dyess.af.mil).

Pilot Tng Classes 55-U and 56-A. Oct. 7-10 in Dayton, OH. **Contact:** Al Doddroe, 12827 Commercial Point Rd., Ashville, OH 43103 (740-983-3489) (adoddroe@earthlink.net).

USAF Military Training Instructor Assn. Oct. 22-24 at Lackland AFB, TX. **Contact:** John Pavey (jayspavey@bellsouth.net) (www.usafmtia.org).

Seeking former **F-104 Starfighter pilots** for a reunion at the Pueblo Weisbrod Aircraft Museum in Pueblo, CO. **Contact:** Pueblo Weisbrod Aircraft Museum, ATTN: Jason Unwin, Aerospace Education Officer, 31001 Magnuson Ave., Pueblo, CO 81001 (719-948-9219 or 719-671-2407) (jbu@ris.net).

Seeking veterans of **RAF Oakington, UK, No. 131 Course** (May 1956), for a reunion in November. **Contact:** C.A. Hardwood, Farthings, 21 Manor Park Dr., Finchampstead, Workingham, Berkshire, UK RG40 4XE (44-0-1189733874) (caharwood@bopenworld.com). ■

Mail unit reunion notices four months ahead of the event to "Unit Reunions," *Air Force Magazine*, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information. We reserve the right to condense notices.

Pieces of History

Photography by Paul Kennedy

Mustang



At first, the North American P-51 Mustang seemed destined only for photoreconnaissance and ground support missions. However, when it exchanged its Allison engine for a stronger Merlin power plant, it became one of the most formidable fighters of World War II. The Mustang became a premier weapon for strafing of ground targets and long-range bomber escort and was the first Britain-based,

single-engine aircraft to penetrate German airspace. This P-51D, on display at the US Air Force Museum, Wright-Patterson AFB, Ohio, was acquired in 1957 from the West Virginia Air National Guard.

1 MILE

IN 6 MINS?

1.5 MILES

IN 9 MINS?

2 MILES

IN 13 MINS?

**YOU FIT THE REQUIREMENTS.
YOUR LONG DISTANCE PLAN SHOULD FIT YOU.**

Looking for a plan with unlimited calling? Affirmative.

A plan with no monthly fee? Roger that.

A plan that offers one low anytime rate? Will comply.

We've got a plan that's right for you. Sign up now.

TALK IS GOOD

1 800 551-3131, ext. 50007 att.com/mil



Try keeping your eyes
open for 30 hours
without blinking.



It's an unmanned aerial vehicle with unmatched capabilities. The Global Hawk, from Northrop Grumman Integrated Systems, sharpens the eyes of the military, providing field commanders with a remarkable array of reconnaissance data. Flying up to 65,000 feet, for 30 hours or more, and with a range spanning half the world, Global Hawk is the only system—current or planned—capable of persistent multi-sensor surveillance. Advanced sensors capture and transmit high-resolution images in near-real time, enabling war fighters to establish information dominance in any battle space. Day or night, in any weather, Global Hawk is a system with a commanding view.

www.northropgrumman.com

©2003 Northrop Grumman Corporation

NORTHROP GRUMMAN DEFINING THE FUTURE™

Integrated Systems